# REDUCING RISKS FOR

# Mental Disorders

## FRONTIERS FOR PREVENTIVE INTERVENTION RESEARCH

Patricia J. Mrazek and Robert J. Haggerty
Editors

Committee on Prevention of Mental Disorders
Division of Biobehavioral Sciences and Mental Disorders

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The serpent has been a symbol of long life, healing, and knowledge among almost al cultures and religions since the beginning of recorded history. The image adopted as a logotype by the Institute of Medicine is based on a relief carving from ancient Greece, nov held by the Staatlichemuseen in Berlin.

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## Committee on Prevention of Mental Disorders

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**PATRICIA J. MRAZEK,** *Study Director*

**CAROLYN E. PETERS,** *Research Assistant*

**CAROL M. HOSPENTHAL,** *Project Assistant*

# Preface

Mental disorders cause an enormous burden on affected individuals, their families, and society. While impressive advances have been made in the past two decades in defining, diagnosing, and treating many of the major mental illnesses once they become full blown, many of these disorders are characterized by a chronic or relapsing course that has high personal and economic costs to all concerned. Cures are rare. Therefore, the logic of trying to prevent the occurrence of mental disorders is clear. Yet, in sharp contrast to the situation in the physical diseases, efforts to prevent mental disorders have had low priority. Many voices have been raised to correct this gap, including Congress, who charged the Institute of Medicine to prepare an integrated report of current research with policy-oriented and detailed long-term recommendations for a prevention research agenda for mental disorders.

The committee appointed by the IOM to carry out this task provided the diversity, the wide view, and the expert knowledge that this field demands. It included a range of disciplines, including adult and child psychiatry, psychology, pediatrics, epidemiology, sociology, anthropology, and public advocacy (see Appendix B).

The committee's process was a multipronged effort. It involved extensive review of a literature that is large in volume but limited in rigorous evaluation of interventions. Conferences were convened with experts who had conducted large-scale interventions to prevent physical diseases, and with experts in the fields of ethics and cultural diversity; and there were spirited committee meetings, in which the form and

substance of the report were debated with an eye towards forgi consensus in the final report. The committee examined some agen budget figures, but it was difficult to get firm data. In addition, seve background papers were commissioned (see Appendix D). Committ members themselves contributed to many of the technical sections of t report. The conclusions and recommendations the committee makes this report are based on its best judgment of the information and da that were available for review.

The committee concludes that the federal government should ta several actions. For some mental disorders there have now be sufficient advances in knowledge to warrant the prompt mounting intensive interventions designed to prevent mental disorders, so long these programs are rigorously evaluated. For other conditions there still the need for development of an adequate knowledge base befo sound theoretically-based interventions are warranted. For the field general there needs to be support for training of a cadre of investigato and for coordination of the currently fragmented efforts in prevention mental disorders across the many departments of government and t private sector.

The committee recognized early that disparate definitions of the fie of prevention were causing confusion in preventing mental disorde The committee, therefore, developed a set of definitions to provi common terminology and to help achieve a common understanding what is being done in the field. To date, the definitions have been broad and flexible that almost everything has been labeled prevention one time or another. The committee's more restrictive definition e cludes interventions aimed at reducing recurrences among patients wi diagnosed illnesses. Instead, we have labeled such programs as a part good treatment. While there are honorable differences of opinion as whether this should be called prevention, the committee recommen that for purposes of monitoring federal research and demonstrati efforts, prevention research be limited to processes that occur befo there is a diagnosable mental illness. When the new definition prevention is used, we will be able to understand better what is bei done in prevention per se. Our estimate is that the field of research true prevention of mental illness, by our definition, is very small.

The committee recognizes the considerable barriers to progress in t prevention field. Currently there is little evidence from research that a specific mental disorder can be prevented. There is, however, consi erable evidence that certain risk factors (some of which are causal of a some only markers of mental disorders) have been clearly identifie Using the model found effective in the prevention of physical diso de

it seems quite appropriate to initiate interventions designed to reduce these identified risk factors (and also to enhance known protective factors) with rigorous evaluations of outcomes. One advantage of targeting interventions on risk factors is that certain clusters of them are common to several disorders, and the potential for reducing more than one disorder by comprehensive intervention is appealing and is likely to be more cost effective.

For other disorders the knowledge base is yet too small and must be further developed before theoretically sound interventions can be tested. Promising areas of research are delineated. For many mental disorders, there is now convincing evidence for a genetic predisposition, but in practically all disorders there is also evidence that the genetic factors do not act alone, and that environmental factors can precipitate, or delay, onset. Therefore, research on understanding the causes of mental disorders must integrate biologic and behavioral sciences. In addition, there is considerable evidence that many mental disorders are brought on by physical diseases and that behavioral factors initiate or delay onset of physical disease. The committee urges more research in the interactions between physical and mental disorders.

The quality of the Institute of Medicine staff was crucial to the development of this report. Dr. Patricia J. Mrazek, the study director, brought a background in both service experience and research expertise, together with her organizational skills and uncompromising attention to scientific evidence, to all aspects of the committee's work. She did most of the writing of the report, ably assisted by Carolyn Peters and Carol Hospenthal. We are very grateful for their skills and dedication.

We believe that the U.S. Congress was wise to initiate this timely review of the field of prevention of mental disorders. The field is so important that the nation must invest the relatively small amounts recommended in this report to capitalize on the advances already made and to develop the knowledge base necessary for future advances. The one-third of our nation who today face the threat of mental disorder during their lifetime will be immediate beneficiaries when effective prevention programs are implemented, and the nation as a whole will ultimately benefit from the lifting of the burden mental disorders placed upon it. The time is right to move ahead with a national agenda to prevent mental disorders.

ROBERT J. HAGGERTY, M.D., *Chair*
BEATRIX A. HAMBURG, M.D., *Vice-Chair*

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Many people outside of the committee contributed to this study in various ways. The committee gratefully acknowledges the enthusiastic support of Dr. Juan Ramos, Deputy Director of Prevention at NIMH and project officer for this study; the excellent assistance of Roseanne Price, who collaborated in the editing and writing of the report; and all of those who contributed by writing commissioned background papers, providing technical reviews of drafts of chapters, and making presentations to the committee. Many others contributed by providing preventive intervention research or service program materials, technical and funding information, and moral support. To all of you, the committee offers its sincere gratitude. The names and affiliations of contributors are listed in Appendix B; additionally, authors of commissioned papers are acknowledged in the relevant chapters. To anyone who was overlooked, please accept the committee's apologies and appreciation.

# Abstract

Hardly a family in America has been untouched by mental illness. As many as one third of American adults will suffer a diagnosable mental disorder sometime in their life, and 20 percent have a mental disorder at any given time. Although research on the causes and treatment of mental disorders remains vitally important—and indeed major advances are leading to better lives for increasing numbers of people—much greater effort than ever before needs to be directed to prevention.

The Senate Appropriations Committee of the U.S. Congress believed that a strategic approach to the prevention of mental disorders was warranted. The Congress mandated the National Institute of Mental Health to enter into an agreement with the Institute of Medicine (IOM) to prepare an integrated report of current research with policy-oriented and detailed long-term recommendations for a prevention research agenda.

The specific tasks of the IOM committee, as negotiated with NIMH and the co-funding agencies, were as follows:

- Review the status of current research on the prevention of mental illness and problem behaviors and on the promotion of mental health throughout the life span. This should include an understanding of available research knowledge, research priorities, and research opportunities in the prevention research area.
- Review the existing federal presence in the prevention of mental disorders and the promotion of mental health, spanning the continuum from research to policy and services.
- Provide recommendations on federal policies and programs of

research support leading to a prevention research agenda as well as o opportunities for maximization of involvement and improvement c coordination among federal agencies.

- Render a "capacity-building" plan for the development of personne and resources necessary to ensure a cadre of prevention researchers.
- Provide an estimate of resources (funding, manpower, trainin opportunities) necessary to make effective scientific progress in prever tion research.
- Prepare a final report that will encourage universities, colleges hospitals, and federal agencies to foster prevention research.

The committee concludes that a critical mass of knowledge relevant t the prevention of mental disorders has accumulated and that opportu nities now exist to effectively use this knowledge to launch a researc agenda. Therefore the committee strongly recommends that an en hanced research agenda to prevent mental disorders be initiated an supported across all relevant federal agencies, including, but not limite to, the Departments of Health and Human Services, Education, Justice Labor, Defense, and Housing and Urban Development, as well as stat governments, universities, and private foundations. This agenda shoul facilitate development in three major areas:

- Building the infrastructure to coordinate research and servic programs and to train and support new investigators.
- Expanding the knowledge base for preventive interventions.
- Conducting well-evaluated preventive interventions.

The three major areas to be developed are recommended in conjunctio with use of the definitions of interventions for mental disorders and c prevention research developed in this report. The term *prevention* is re served for only those interventions that occur before the initial onset of disorder. These preventive interventions can be further classified into un versal, selective, and indicated types, depending on the targeted popula tion group. The term *prevention research*, as used in this report, refers onl to preventive intervention research and is distinct from research that build a broad scientific base for preventive interventions. This latter research prevention-related, but it is not prevention research per se.

## BUILDING THE INFRASTRUCTURE

Preventive intervention research for mental disorders cannot thriv without providing for its infrastructure. Two areas are particularl important for moving ahead—coordination and research training.

- Coordination among federal agencies is needed for four reasons: (1) variation in the application of definitions has made it virtually impossible to assess the current activities and expenditures in preventive intervention research; (2) duplication of research activities and the lack of piggybacking of smaller projects onto larger ones contribute to waste of dollars and time, and, at the same time, gaps in research go undetected; (3) agencies conduct research or provide interventions for mental disorders (including addictions), educational disabilities, criminal behavior, and physical disorders as though these were separate conditions, whereas more often than not, coexisting disorders or problems occur; and (4) agencies have different strengths; for example, some are better at applying rigorous research methodologies to intervention programs, whereas others are better at reaching out into communities and forging alliances.

Therefore the committee strongly recommends that a mechanism be created to coordinate research and services on prevention of mental disorders across the federal departments. One model for accomplishing this would be the establishment of a national scientific council on the prevention of mental disorders by Congress and/or the President. Such an overarching federal council could be operated out of the White House Office of Science and Technology Policy or another coordinating office within the Executive Office of the President.

- The committee also strongly recommends that Congress encourage the establishment of offices for prevention of mental disorders at the state level.
- Agencies must be required to identify their funded programs for the prevention of mental disorders, separately accounting for universal, selective, and indicated preventive interventions, using the definitions developed in this report.
- The National Institute of Mental Health (NIMH), the National Institute on Alcohol Abuse and Alcoholism (NIAAA), and the National Institute on Drug Abuse (NIDA) should consider including prevention researchers with broad mental health perspectives on their national advisory councils.
- Mental health reimbursement from existing health insurance should be provided for preventive interventions that have proved effective under rigorous research standards such as those described in this report.
- Dissemination activities should receive much higher priority than they have in the past.
- Congress and federal agencies should take steps immediately to develop and support the training of additional researchers who can

develop new preventive intervention research trials as well as evaluat the effectiveness of current service projects.

- Research training should be focused on two groups—mid-caree scientists and postdoctoral students.
- The number of institutional training programs focusing on prever tive intervention research should be increased from 5 to 12 over the ne five years, including one at every specialized prevention researc center, known at NIMH as Preventive Intervention Research Cente (PIRCs), that is productive.
- Support for faculty within institutional training programs shoul be increased.
- A major effort should be made to encourage the preventio research training of minorities.
- The proposed national scientific council on the prevention c mental disorders should reevaluate the training needs for preventiv intervention research after the first five years.

## EXPANDING THE KNOWLEDGE BASE

The committee believes that a viable research agenda for prevention c mental disorders rests on a firm stratum of health research in othe fields. This knowledge base includes basic and applied research in th core sciences that is aimed at the causes and prevention of menta disorders. Included in this knowledge base are neurosciences, genetics epidemiology, psychiatry, behavioral sciences (including developmenta psychopathology), and risk research. It also includes evidence an lessons from other fields of research, such as prevention of physica illness and treatment of mental disorders. Therefore,

- Research to expand the knowledge base for preventive interver tions should be continued.
- Support for research on potentially modifiable biological an psychosocial risk and protective factors for the onset of mental disorder should be increased. Priority should be given to research that illum nates the interaction of potentially modifiable biological and psychoso cial risk and protective factors, rather than restricting the research t either biological or psychosocial factors alone.
- NIMH should support a series of prospective studies on wel defined general populations under the age of 18 to provide initia benchmark estimates of the prevalence and incidence of mental diso ders and problem behaviors in this age group.
- A population laboratory should be established with the capacit

for conducting longitudinal studies over the entire life span in order to generate understanding as to how risk factors and developmental transitions combine to influence the development of psychopathology.

- Whenever possible, research proposals relevant to the knowledge base for preventive interventions should explicitly state this connection, such as identification of potentially modifiable risk factors and possible avenues for preventive interventions.
- Treatment intervention research conducted under rigorous methodological standards that is directly relevant to preventive intervention research should continue to be supported—but not from the prevention research budget.
- Research should continue to be supported to determine which risk and protective factors are similar and which ones are different for treatment and prevention of a variety of mental disorders.
- Research should be supported to study the effects of social environments, such as families, peers, neighborhoods, and communities, on the individual and the effects of context on the onset of various mental disorders.
- Researchers working on relevant research in the core sciences should be encouraged to participate in activities such as forums and colloquia with preventive intervention researchers.
- A comprehensive, descriptive inventory of the activities in which the public engages to promote psychological well-being and mental health should be developed and supported.

## CONDUCTING WELL-EVALUATED INTERVENTIONS

The knowledge base for some mental disorders is now advanced enough that preventive intervention research programs, targeted at risk factors for these disorders, can rest on sound conceptual and empirical foundations. Therefore,

- Increased methodological rigor in all research trials, demonstration projects, and service program evaluations should be required.
- The concept of risk reduction, including the strengthening of protective factors, should be used as the best available theoretical model for guiding interventions to prevent the onset of mental disorders.
- Universal preventive interventions should continue to be supported in the areas of prenatal care, immunization, safety standards such as the use of seat belts and helmets, and control of the availability of alcohol.

- Research on selective and indicated interventions targeting high risk groups and individuals should be given high priority.
- Priority should be given to preventive intervention research pro posals that address well-validated clusters of biological and psychosocia risk and protective factors within a developmental life-span framework
- Increased attention should be given to preventive interventio research that addresses the overlap between physical and mental illness
- Research support should be developed in two waves over the nex decade, initially focusing primarily on increasing research grant suppor for individual investigators and later on increasing support for prever tive intervention research centers.
- Research on sequential preventive interventions aimed at multipl risks in infancy, early childhood, and elementary school age to prever onset of multiple behavioral problems and mental disorders should b increased immediately and substantially.
- Research on preventive interventions aimed at major depressiv disorder should be increased immediately and substantially.
- Research on preventive interventions aimed at alcohol abus should be increased immediately.
- Support for pilot and confirmatory preventive intervention trial should be increased for conduct disorder.
- Research should be supported on alternative forms of interventio for the caregivers and family members of individuals with menta disorders, especially Alzheimer's disease and schizophrenia, to prever the onset of stress-induced disorders among these caregivers.
- Over the next decade, as new specialized prevention researc centers are initiated across the federal government, priority should b given to those that are sponsored through interagency agreement.
- Knowledge base research at the specialized prevention researc centers should be supported by new research grants (RO1s) that do no use preventive intervention research dollars.
- Dissemination mechanisms, including publication in peer-reviewe journals, and knowledge exchange opportunities with other researcher and with representatives from the community should be mandated as pa of the mission of each specialized prevention research center.
- The preventive intervention research cycle as described in thi report should be used as a conceptual model for designing, conducting and analyzing research programs.
- Increased attention to cultural diversity, ethical considerations and benefit-cost and cost-effectiveness analyses should be an essentia component of preventive intervention research.
- Community involvement should be increased to help identif

disorders and problems that merit research and to support preventive intervention research programs.

There could be no wiser investment in our country than a commitment to foster the prevention of mental disorders and the promotion of mental health through rigorous research with the highest of methodological standards. Such a commitment would yield the potential for healthier lives for countless individuals and the general advancement of the nation's well-being. The committee recommends increased support for a research agenda, beginning with an increase of $50.5 million in fiscal year 1995. But even with the support of the federal government, the effort will not be easy. Overall, what is required is a national commitment to rigorous research and cooperation among federal, state, and local agencies, as well as universities, foundations, researchers, and communities.

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# Reducing Risks for Mental Disorders

# OVERVIEW

# 1

# Introduction

In his 1963 message to Congress, President John F. Kennedy drew the nation's attention to the critical problem of mental illness and championed prevention as a promising approach. He contended that prevention could proceed along two fronts: "Prevention will require both selected specific programs directed especially at known causes, and the general strengthening of our fundamental community, social welfare, and educational programs which can do much to eliminate or correct the harsh environmental conditions which often are associated with mental retardation and mental illness" (Kennedy, 1963). These prevention activities were designated to take place in part within the newly created, federally mandated system of community mental health centers. However, other agendas took precedence within the centers, and little prevention work was actually done (Torrey, 1988; Klein and Goldston, 1977).

Thirty years after Kennedy's message, the problems of mental illness are still immense. In this country, it is estimated that 20 percent of adults suffer from an active mental disorder in a given year, and 32 percent can be expected to have such an illness sometime during their life (Robins and Regier, 1991). These estimates, which come from the National Institute of Mental Health's Epidemiologic Catchment Area (ECA) study, are the most current statistics based on government-supported research. The estimates are considerably higher than the 10 to 15 percent estimated as the annual prevalence of mental disorder by the President's Commission on Mental Health (1978) and reflect the growth of knowledge in this area. The ECA figures are larger—and probably more accurate—because of improve-

ments in methodology and instrumentation. However, differences i diagnostic criteria may also account for some of the difference in th estimates. The ECA study defined active disorder as a disorder for whic criteria (codified in the third edition of the *Diagnostic and Statistical Manu of Mental Disorders* [American Psychiatric Association, 1980]) had been m at some time in the person's life and at least one symptom (or one episod had been present in the year prior to interview.

Mental disorders can occur throughout the life span, but the type an nature of the illnesses vary with age. At least 12 percent (or about 7. million) of our nation's 63 million children and adolescents suffer fro one or more mental disorders—including autism, attention deficit hy peractivity disorder, severe conduct disorder, depression, and alcoh and psychoactive substance abuse and dependence (DHHS, 1991; IOM 1989; OTA, 1986). Based on a review of seven epidemiological studie the Office of Technology Assessment (OTA, 1991) reported that th prevalence of diagnosable mental disorders among individuals und age 20 may be closer to 20 percent. In 1990, suicide ranked as the thir leading cause of death among 15- to 24-year-olds (National Center fo Health Statistics, 1993). The American Academy of Child and Adole cent Psychiatry (1990) reported that growing numbers of children an adolescents are at exceptionally high risk for developing a menta disorder: for example, 1.5 million children and adolescents are reporte abused or neglected each year, 300,000 are in the foster care system, an 7 million live with an alcoholic parent. In addition, more than 18,50 children and adolescents have been left motherless by the HIV/AID epidemic, and that number will more than double by 1995 (Michaels an Levine, 1992). Toward the other end of the life span are the 4 millio older Americans who, according to a National Institute on Agin estimate, are likely to be suffering from Alzheimer's disease (Evan Scherr, Cook, Albert, Funkenstein, Smith et al., 1990) and the 15 to 2 percent of the elderly in nursing homes who are clinically depresse (NIH Consensus Development Panel on Depression in Late Life, 1992

Mental illness of this magnitude places an extraordinary burden o the financial and social resources of this country. Current expenditure in this area include not only core costs such as direct costs for treatmen and indirect costs for lost worker productivity, but also related cost such as those resulting from investment of time while caring fo mentally ill family members. One estimate put our annual total ec nomic cost of drug abuse, alcohol abuse, and mental illness at just ov $218 billion in 1985, of which $44 billion was for drug abuse, $70 billio for alcohol abuse, and $103 billion for other mental illness (Ric Kelman, Miller, and Dunmeyer, 1990). Based on this study, usin

socioeconomic indexes, Rice and colleagues have estimated that for 1990 the totals were over $66 billion for drug abuse, $98 billion for alcohol abuse, and $147 billion for other mental illness (D. Rice, personal communication, April 1993). The concomitant cost in human suffering and lost opportunity is incalculable.

Mental and physical health are closely linked, and beyond the costs just described, the contribution of mental health to physical well-being has to be considered. Physical disorders can cause serious mental disorders, and physical disorders can have their origin in psychosocial processes (IOM, 1982). Studies estimate that 60 percent of visits to physicians for medical symptoms are due in part or whole to psychosocial problems (Regier, Goldberg, and Taube, 1978), and the frequency of diagnosable mental disorder found in studies of general practice ranges from 11 to 36 percent (Eisenberg, 1992; Barrett, Barrett, Oxman, and Gerber, 1988). In a comparison of the functioning of patients with depression and patients with chronic medical conditions, only chronic heart disease produced more disability than depressive symptoms (Wells, Stewart, Hays, Burnam, Rogers, Daniels et al., 1989). Contrary to the current rigid arbitrary separation of research on mental and physical disorders, the human condition is one in which the mental and physical processes inexorably intertwine.

Despite enormous expenditures attempting to contain the problem of mental illness, it is estimated that only 10 to 30 percent of those in need receive appropriate treatment (DHHS, 1991; IOM, 1989; NMHA, 1986). Thus it is time to take a fresh look at prevention to see if it can be made to function as a full partner with new treatment approaches in addressing our nation's mental health care crisis.

## A NEW EMPHASIS ON PREVENTION: OPPORTUNITIES AND STRENGTHS

Several forces are coming together to enhance the timeliness of a new emphasis on research to prevent mental disorders. As is detailed in the chapters to come, the knowledge base for preventive interventions, which had been scanty in the 1960s, has undergone a remarkable expansion, fueled by a considerable research effort within the past decade. Fundamental advances in our understanding of the biological substrates and genetics underlying numerous mental disorders and of the role of environmental factors in the onset of specific disorders have been made. There is also a promising variety of new interventions that offer a much more optimistic view for the future of prevention of some specific mental disorders.

The concept of risk reduction is at the heart of prevention research Risk factors are those characteristics, variables, or hazards that, i present for a given individual, make it more likely that this individual rather than someone selected from the general population, will develop a disorder (Werner and Smith, 1992; Garmezy, 1983). In this report a broad definition of risk factors is used, encompassing biological (includ ing genetic), psychological, and social factors in the individual, family and environment. Recent research has demonstrated that many at-risk individuals also have variables in their background or life that serve as protective factors. A well-documented description of the interplay between risk and protective factors is a critical scientific first step in establishing successful preventive intervention programs. Such a de scription is now available for some disorders, and research is under way to identify such factors for a number of others. The next step is to identify causal risk factors that may be malleable, that is, that can be altered through interventions. Then the effects of these interventions are tested in systematic, empirical, and rigorous ways, most often in preventive intervention trials. This step also contributes to the funda mental knowledge base through the determination of causality and malleability. One way to determine causality and malleability of risk factors for specific disorders is through examination of preventive interventions aimed at a single factor or a cluster of factors. If risk factors can be decreased or in some way altered, and/or if protective factors can be enhanced, the likelihood that at-risk individuals would eventually develop the mental disorder would decrease.

This risk reduction model is widely used for prevention of physical illness. As described in Chapter 3 of this report, to prevent physical disorders due to complex multiple causes, such as cardiovascular disease, the strategy is to determine risk factors and then to target interventions to such risk factors or to people with these risk factors. As with any disorder with multiple causes, it is difficult to document that any specific physical illness can be prevented in a given individual by risk reduction. However, indirect evidence from matching trends of risk reduction across populations with decreases in mortality or morbidity in groups that have changed behaviors is highly consistent with this theory, and results are encouraging. For example, through behavioral changes in diet and smoking, declines in the risks of morbidity have been achieved.

The study of mental disorders is at the stage where the knowledge base is comparable to the knowledge base prior to the large trials in the prevention of physical illnesses. Because of the power of the risk reduction model, this report is entitled *Reducing Risks for Mental Disor-*

*ders: Frontiers for Preventive Intervention Research.* A large body of knowledge exists today about the risk factors associated with many major mental disorders, the preventive interventions directed at reducing these risk factors and improving protective factors, and the research methods to assess the effectiveness of these interventions. This body of knowledge reflects the major advances that have been made in the field of mental disorder prevention.

## OBSTACLES TO PROGRESS

Despite these recent advances in the prevention field and the fact that the history of mental health efforts related to prevention dates back many decades (see Table 1.1), progress has been limited because the efforts have been sporadic and have often lacked focus. Why hasn't the field received more concentrated attention? In response to a request from Congress and the National Institute of Mental Health (NIMH), the Institute of Medicine's Committee on Prevention of Mental Disorders examined this question as part of a broad review of the status of prevention research.

The committee found several apparent reasons for this inattention, some of which reflect problems that are shared with the larger field of treatment of mental disorders. One of the most important is that mental disorders have long carried a stigma. Because many people consider such illnesses to arise from a defect in character or will, patients and their families still try to hide the disorder and thus never seek or receive needed attention. Even some federal agencies heavily involved in the prevention and treatment of mental disorders (e.g., agencies supporting interventions aimed at alcohol and substance abuse and dependence) do not use the term *mental disorder.* Another difficulty is that even though research has shown that a number of effective treatment interventions are available—such as those for depression and anxiety disorders—this information is not generally known by the public. Also, many believe that unless treatment for a particular disorder is highly effective, nothing can be done in regard to prevention. In fact, for some disorders, such as conduct disorder, prevention may have a particularly important role because treatment has been so ineffective.

Another problem has been the lack of an organizing theoretical framework in the prevention of mental disorders. Only recently has the concept of risk reduction begun to take hold. Also, current understanding of the mechanisms that link risk and protective factors with proximal and distal outcomes is not well established for mental disorders. A great deal more is known about how to prevent some physical diseases (e.g.,

## TABLE 1.1 Time Line of Events Related to Prevention of Mental Disorders

**1909** The Mental Health Association was founded; subsequently it became the National Association for Mental Health and then the National Mental Health Association (NMHA). Since its inception, it has advocated for prevention of mental illness and promotion of mental health.

**1910** Public meeting on "Prevention of Insanity" organized by the New York Committee on Mental Hygiene. Topics included alcoholism, syphilis, drug addiction, head injuries, infectious diseases such as meningitis, and influences o fatigue and stress.

**1915** *The Proceedings of the National Conference of Charities and Correction* contained pape on prevention of mental illness and mental retardation. The ideas included sterilization, reduced immigration, and more institutions to lower the numbers o "feeble-minded" in the community.

**1920s** The child guidance movement and the mental hygiene movement (fostered by the National Committee for Mental Hygiene that was organized by Clifford Beers) were begun. Both movements were committed to prevention as well as treatment of mental illness and highly valued the role of local communities in solving problems, including prevention of juvenile delinquency.

**1930** The White House Conference on Child Health and Protection issued a report with an expanded focus that included social and environmental factors that affec the physical and mental health of children.

**1930s** The national commitment to prevention decreased, and the treatment-oriented approach began to dominate. Insurance plans created at this time reinforced the illness/treatment approach.

**1946** Passage of the National Mental Health Act (P.L. 487) authorized the creation of the National Institute of Mental Health (NIMH).

**1948** The World Federation for Mental Health, an independent organization with clos ties to the United Nations, was created and included prevention within its purview.

**1948** The Mental Health Study Center, a small NIMH community laboratory, was established in Prince Georges County, Maryland, to apply public health principles to the practice of mental health at the community level. For the nex 34 years, research was done and treatment and prevention services were provided.

**1954** The first organized training program in mental health consultation, which included a prevention component, began at the Harvard School of Public Health Laboratory of Community Psychiatry.

**1955** The Mental Health Study Act directed the Joint Commission on Mental Illness and Health to analyze and evaluate the needs and resources of the mentally ill and make recommendations for a national mental health program.

**1961** The Joint Commission on Mental Illness and Health released *Action for Mental Health* to the Senate and House of Representatives.

**1963** President John F. Kennedy, in a message to Congress, championed prevention a an approach to the problem of mental illness.

TABLE 1.1 (*Continued*)

**1963** The Community Mental Health Centers Act listed mental health consultation and education, which included prevention, as one of the five essential services necessary for such centers to qualify for federal funds. This was the first time in any federal health statute that a preventive service was declared mandatory.

**1969** The Joint Commission on Mental Health of Children produced a report saying that millions of children were in need of services, and millions were at risk.

**1973** NMHA formed a Prevention Task Force.

**1975** The first Vermont Conference on the Primary Prevention of Psychopathology was sponsored by the World Federation for Mental Health, NIMH, and the John D. and Catherine T. MacArthur Foundation.

**1976** The Conference on Primary Prevention sponsored by NIMH resulted in *Primary Prevention: An Idea Whose Time Has Come.*

**1978** The President's Commission on Mental Health reported that (1) efforts to prevent mental illness and promote mental health were unstructured, unfocused, and uncoordinated and (2) preventive efforts received insufficient attention at the federal, state, and local levels. The commission recommended establishing a Center for Prevention in NIMH.

**1978** The position of Coordinator for Disease Prevention and Health Promotion was established at the National Institutes of Health (NIH).

**1979** The first annual Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA) Conference on Prevention was held.

**1980** The NIH Prevention Coordinating Committee was formed, with the NIH Coordinator for Disease Prevention and Health Promotion as the designated prevention coordinator.

**1980** The Public Health Service Act (in response to the presidential endorsement of the 1978 President's Commission on Mental Health) was amended to give special attention to efforts to prevent mental disability. Among other requirements, this act and a 1983 amendment (1) established the Office of the Deputy Director for Prevention and Special Projects in NIMH, and (2) designated an Associate Administrator for Prevention within ADAMHA to promote and coordinate prevention programs, including those run by NIMH, the National Institute on Drug Abuse (NIDA), and the National Institute on Alcohol Abuse and Alcoholism (NIAAA). The Associate Administrator was made responsible for an annual report to Congress describing the prevention activities undertaken by ADAMHA and its agencies.

**1980** NIDA established its Prevention Research Branch.

**1981** The Select Panel for Promotion of Child Health (established by Public Law 95–626) presented its findings to the U.S. Congress and the Secretary of Health and Human Services. The panel reported a need for better coordination of mental health and health services due to the frequent concomitance of health and mental health problems in children.

**1981** The Omnibus Budget Reconciliation Act folded the community mental health centers into alcohol, drug abuse, and mental health block grants to the states and introduced large cuts in all human service appropriations.

*(continued)*

TABLE 1.1 (*Continued*)

**1982** The Center for Prevention Research (CPR) was established at NIMH. This was step toward consolidation of preventive intervention research throughout NIM into one unit.

**1983** NIMH Center for Prevention Research established its first Prevention Intervention Research Center (PIRC).

**1983** ADAMHA Associate Administrator for Prevention was appointed, as mandate by an amendment to the Public Health Service Act, to promote and coordinate the research programs of its component agencies—NIAAA, NIDA, and NIMH.

**1984** NMHA established the Commission on the Prevention of Mental-Emotional Disabilities.

**1985** NIMH appointed its first Deputy Director for Prevention, mandated by the 198 Public Health Service Act.

**1985** The Office of Substance Abuse Prevention (OSAP) was established.

**1985** NIDA published the first of several monographs dealing with preventing drug abuse.

**1985** The Center for Prevention Research reorganized into the Prevention Research Branch within the newly created Division of Clinical Research in NIMH.

**1986** A prevention initiative was undertaken by the American Academy of Child an Adolescent Psychiatry, and a Project Prevention Steering Committee was form The initiative resulted in a series of prevention monographs published by OSA

**1986** NIAAA established the Prevention Research Branch within the Clinical and Prevention Research Division, created at the same time.

**1986** The position of Assistant Director for Disease Prevention at the Office of Direct level was established within NIH.

**1986** The Office of Technology Assessment (OTA) issued a report entitled *Children's Mental Health: Problems and Services*. The report concluded that there was a substantial theoretical and research base to show that mental health interventi were effective for children.

**1986** NMHA released a report by the Commission on the Prevention of Mental-Emotional Disabilities, *The Prevention of Mental-Emotional Disabilities*.

**1987** NIMH published *Preventing Mental Disorders: A Research Perspective*.

**1987** The National Prevention Coalition was established within NMHA.

**1989** The U.S. General Accounting Office issued a report to Senator Inouye, *Mental Health: Prevention of Mental Disorders and Research on Stress-Related Disorders*, a critique of the implementation of prior recommendations in the prevention fiel

**1989** The Institute of Medicine (IOM) issued *Research on Children and Adolescents with Mental, Behavioral, and Developmental Disorders: Mobilizing a National Initiative*. Prevention was not emphasized.

**1990** Because of a congressional mandate, NIMH entered into an agreement with IO so that IOM could prepare an integrated report of current prevention research, with policy-oriented and detailed long-term recommendations for a prevention research agenda.

TABLE 1.1 (*Continued*)

| | |
|---|---|
| **1990** | The American Psychiatric Association published a report prepared by the Task Force on Prevention Research of the Council on Research with a review of research on the prevention of psychiatric disorders. |
| **1990** | The American Academy of Child and Adolescent Psychiatry published *Prevention in Child and Adolescent Psychiatry: The Reduction of Risk for Mental Disorders.* |
| **1990** | *A National Plan for Research on Child and Adolescent Mental Disorders* (National Advisory Mental Health Council) emphasized scientific research concerning biomedical risk factors and capacity building for scientific researchers. |
| **1990** | NIMH held its first National Conference on Prevention Research, and a NIMH Steering Committee on Prevention was established to write a report on the current status of prevention research within NIMH. |
| **1992** | The ADAMHA Reorganization Act abolished ADAMHA, organized the three research institutes (NIAAA, NIDA, and NIMH) under NIH, and provided for an Associate Director for Prevention in each research institute. The service components from ADAMHA were reorganized into the Substance Abuse and Mental Health Services Administration (SAMHSA) as the Center for Substance Abuse Treatment, the Center for Substance Abuse Prevention, and the Center for Mental Health Services. |
| **1992** | The IOM Committee on Prevention of Mental Disorders was formed in accordance with the NIMH agreement. |
| **1993** | NIMH Steering Committee on Prevention released *The Prevention of Mental Disorders: A National Research Agenda* at the third NIMH National Conference on Prevention Research. |

through immunizations for specific infections). The lack of clarity regarding risk mechanisms for mental disorders has contributed to a reluctance to launch preventive interventions without additional research (Sameroff, 1990). However, it is not generally realized that at the beginning of many large intervention programs to prevent physical diseases, such as heart disease, the part of the knowledge base regarding risk mechanisms was also small. Large-scale prevention efforts were instituted with clear concepts but a modest knowledge base with regard to mechanisms, and the resulting research has yielded important information about the etiology of these diseases, the malleability of identified risk factors, and the risk mechanisms in multiple causal chains.

Difficulties in identifying, defining, and classifying mental disorders also present barriers to successful prevention. A culture of the bacteria establishes the diagnosis of a streptococcal sore throat. In contrast, mental disorders rarely have a single cause and do not have such a "gold standard" confirmatory diagnostic test. Mental disorders are currently defined by a description of a cluster of symptoms associated with clinical

dysfunction. These have been codified in an evolving classificati system called the *Diagnostic and Statistical Manual of Mental Disord* (DSM), published by the American Psychiatric Association. The fi edition was published in 1952, the current edition is the third revis (DSM-III-R), and a fourth edition is expected imminently. This syste conceptualizes each mental disorder as "a clinically significant beha ioral or psychological syndrome or pattern that occurs in a person a that is associated with present distress or disability or with a signi cantly increased risk of suffering death, pain, disability, or an importa loss of freedom" (American Psychiatric Association, 1987).

Valid and reliable classification of disorders is a prerequisite advances in the scientific understanding of mental disorders across t life span. The goal is for the nosologic system to be reliable enough ensure that different investigators assign diagnoses according to t same criteria so that cross-study comparisons can be made with con dence. At the same time, diagnostic categories aim to be as discrete possible so that when an individual is diagnosed, a standardiz treatment is available. These systems of classification are of cou empirically derived and somewhat arbitrary, and they do not necessar improve the process of making a diagnosis for a particular individua

Major and continuing advances have been made in the validity a reliability of psychiatric classification over the past 30 years, especia for adult disorders. Despite these advances, many problems with t classification of mental disorders remain, all of which will increasing affect the prevention field as it more specifically focuses not only on t reduction of risk factors but also on the reduction of initial onset disorders:

- Not all scientists whose work is relevant to preventive interve tions agree on which diseases to include in the category of men disorders, and, for a few diagnoses, what constitutes a mental disord For example, despite general consensus on their psychiatric status a the fact that they are officially codified in DSM-III-R, alcohol a psychoactive substance abuse and dependence and Alzheimer's disea are sometimes classified as addictive and neurological disorders, resp tively, rather than as mental disorders. In addition, conduct disorder a diagnosis continues to raise controversy. Some clinicians and researc ers say that it should be examined as a "social diagnosis" rather than a mental disorder.

It should be noted that there are behavioral, psychological, and soc problems that may merit intervention that, nonetheless, are not men disorders themselves, nor are they necessarily attributable to men

disorders. For example, mild, transient depressive or anxiety symptoms, which are common throughout the life span, are not mental disorders. Likewise, teenage pregnancy is not a mental disorder, although mental disorders such as bipolar disorder or substance abuse are sometimes associated with it.

- Classification of children's mental disorders poses particular problems. Far too often, children's unique expression of complicated behaviors and feelings has not been appreciated, and children have been saddled with adult diagnostic criteria. To address this issue, a national epidemiological study of the status of children's mental health is needed. Methodological issues related to the design of such a study are currently being addressed prior to its full implementation.
- Another problematic area in diagnosis is the considerable co-occurrence of two or more different mental disorders in an individual and the ambiguity of classification in such instances. DSM-III-R recognizes this and makes no claim that each mental disorder as described is a discrete entity.
- In addition to DSM, there is another classification system, *The International Classification of Diseases* (ICD, 1992). Whereas DSM has been widely accepted in the United States, ICD is well established throughout Europe. Having two systems that had many differences has made comparison of international data more difficult. However, much progress has been made in increasing the compatibility of these two systems, and DSM-IV and ICD-11 promise to be quite similar for most diagnoses.
- The DSM and ICD classification systems for mental disorders have changed frequently, and they will continue to evolve as more is learned about these illnesses. Essentially, the disorders are "moving targets" as diagnostic power advances. Long-term follow-up studies that use diagnostic codes become more complicated as a result of these changes.

Confusion about terminology extends to the terms *prevention* and *prevention research,* which mean different things to different federal agencies, advocacy groups, and professionals (see Chapter 2). Even scientists within federal research institutes are unlikely to agree as to what constitutes prevention of mental disorders. Although this problem has been recognized for many years, it has remained intractable.

Because of this semantic confusion, it is difficult to compare data derived from different sources or to estimate the nature and scope of prevention services and research regarding mental disorders. Accordingly, it is also challenging, if not impossible, to obtain reasonably accurate estimates of the level of support of these activities. The lack of clarity has contributed to a manipulation of terminology to secure funds

earmarked for prevention. This, in turn, has culminated in an intens and at times antagonistic, competition for funds among agencie research institutes, and advocacy groups.

## LOOKING FORWARD

Despite the obstacles, there has been an expansion in the knowledg base for prevention of mental disorders, an increase in methodolog and the development of some promising preventive intervention Circumstances have combined to present an extraordinary opportuni to investigate the prevention of mental disorders much more seriousl It is time for a new emphasis on a sophisticated prevention researc agenda and a new stature for such research. To achieve this, the fie will need to attract good people from a broad range of disciplines and b able to support their research endeavors.

Currently, society at large is placing greater emphasis on person health and disease prevention. Many people are striving to impro their physical and mental well-being, not just to avoid illness but achieve what they consider greater personal rewards, including a mo active life and a generally more positive disposition (Breslow, 199( People are beginning to recognize that their physical health and ment health are intertwined. Some government and business organizatio are advocating prevention programs, not only to improve health, b also with the hope of reducing the nation's health care bill, no approximately 14 percent of the gross domestic product (Burner, Wald and McKusick, 1992). Three federal agencies have recently recognize the increasing importance of prevention. The U.S. Department Health and Human Services issued national objectives for health pr motion and disease prevention, including mental and physical health, its report *Healthy People 2000* (DHHS, 1991). The U.S. Centers for Disea Control, one of the primary federal health agencies, officially changed i name in late 1992 to the Centers for Disease Control and Prevention, ar the National Institute of Mental Health recently issued a report on national research agenda for the prevention of mental disorders (NIMI 1993). In this type of cultural climate, efforts to prevent mental disorde may well find fertile soil.

## ORGANIZATION OF THIS REPORT

The committee began its work with a review of the definitions prevention and prevention research. With a clearer definition of wh constitutes preventive intervention, the committee undertook a review

the current state of research in and relevant to the prevention of mental disorders and the promotion of mental health throughout the life span.

The committee selected five illustrative disorders to outline what is currently known about opportunities for preventive intervention research: Alzheimer's disease, schizophrenia, depression, alcohol abuse and dependence, and conduct disorder. The disorders were selected to demonstrate a range of potential etiologies—from largely psychosocial (conduct disorder) to largely biological (Alzheimer's disease)—and a range of age of onset of disorder—from childhood to late adulthood. There are, of course, many other disorders that could be used as illustrations, but space precludes their inclusion in this report.

In its review of the field, the committee noticed a common inclination to view prevention research as implementation and evaluation of randomized controlled trials to assess the impact of a preventive intervention. In fact, however, these trials are only part of a multistage research cycle in which each of the steps is linked sequentially and logically to other steps. Ideally in this process, the results of earlier steps inform subsequent research steps in important ways. A brief explication of the preventive intervention research cycle is critical both to gain perspective on the knowledge base that provides the foundation for any preventive trial and to evaluate the actual contributions of subsequent research activities to the knowledge base. Figure 1.1 provides a schematized version of the various steps in this cycle and is explained more fully in a later chapter.

The committee found the framework of the preventive intervention research cycle useful as a loose guide to the structure of its review of the field. And with this framework in mind, the reader may be similarly guided through this report and experience conceptually the stages he or she would go through in designing a prevention program. Following the introduction and description of definitions in Chapters 1 and 2, the committee presents a series of chapters on lessons learned from prevention of physical illness (Chapter 3); from the core sciences that provide part of the knowledge base for preventive interventions (Chapter 4); from a description of illustrative mental disorders (Chapter 5); from research on risk and protective factors associated with the onset of mental disorders (Chapter 6); from a review of illustrative preventive interventions for mental disorders that serve as promising models for future interventions (Chapter 7); from treatment research (Chapter 8); and from a review of the field of mental health promotion (Chapter 9). Throughout this report, as throughout the preventive intervention research cycle itself, the critical issues of ethics, cultural diversity, and economics unfold and require our attention.

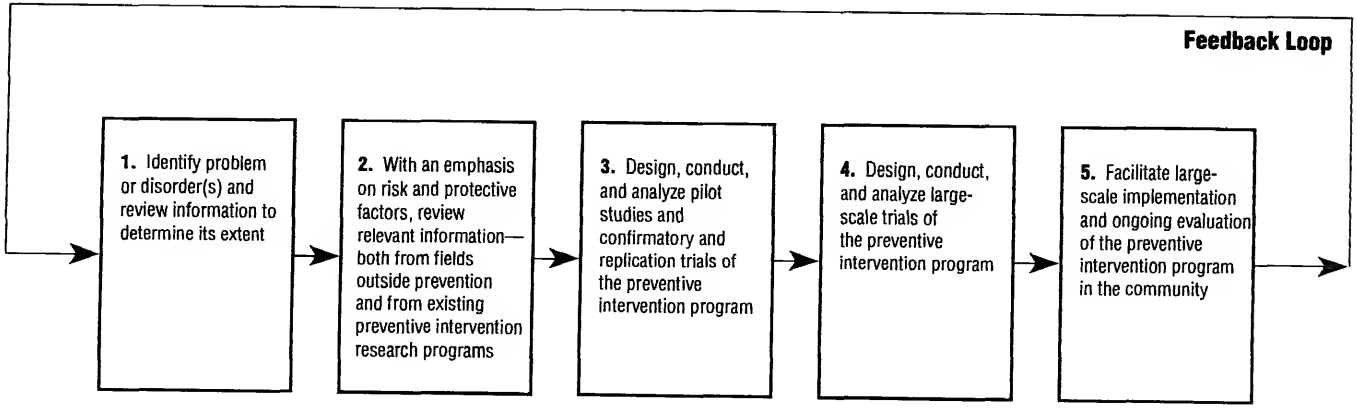


FIGURE 1.1 The preventive intervention research cycle. Preventive intervention research is represented in boxes three and four. Note that although information from many different fields in health research, represented in the first and second boxes, is necessary to the cycle depicted here, it is the review of this information, rather than the original studies, that is considered to be part of the preventive intervention research cycle. Likewise, for the fifth box, it is the facilitation by the investigator of the shift from research project to community service program with ongoing evaluation, rather than the service program itself, that is part of the preventive intervention research cycle. Although only one feedback loop is represented here, the exchange of knowledge among researchers and between researchers and community practitioners occurs throughout the cycle.

In the final section of the report the committee builds the agenda for the future: how to design, conduct, and analyze preventive interventions within the preventive intervention research cycle (Chapter 10) and how to exchange knowledge about preventive interventions and mental health promotion among researchers, practitioners, and communities (Chapter 11). The committee then assesses the infrastructure of the field, focusing on coordination, funding, and personnel (Chapter 12). In its major conclusions and recommendations (Chapter 13), the committee describes its vision for fulfilling the promise of the field of mental disorder prevention.

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# 2

# New Directions in Definitions

To prevent" literally means "to keep something from happening." Different notions about what that something is—first incidence, relapse, disability associated with a disorder, or the sk condition itself—constitute a source of confusion in the field of ıental health regarding the term *prevention*. An important first step in renewed prevention effort is to arrive at commonly agreed upon efinitions of the terms *prevention* and *prevention research*. Without this, revention will continue to be a confused field with disagreement on its cope.

To begin the definitional process, it is necessary to look back over 100 ars to the roots of public health concern with prevention. The original, nd highly successful, prevention model addressed infectious disease. ıs a result of mass immunizations with specific vaccines and the introduction of hygienic measures, the infectious diseases that were the eading cause of death and disability in 1900 dramatically declined by 970 (DHEW, 1979). Because of its record of success, this model was xtended for use with a broad range of prevention efforts for noninfectus diseases and other chronic physical illnesses.

## CLASSIFYING PREVENTIVE INTERVENTIONS FOR PHYSICAL ILLNESS

The original public health classification system of disease prevention as proposed by the Commission on Chronic Illness (1957). It consists f three types of prevention: primary, secondary, and tertiary. *Primary*

*prevention* seeks to decrease the number of new cases of a disor
illness (*incidence*). *Secondary prevention* seeks to lower the rate of e
lished cases of the disorder or illness in the population (*preval*
*Tertiary prevention* seeks to decrease the amount of disability assoc
with an existing disorder or illness. Although the goals of these
types of prevention appear to be clear-cut, in practice there is con
able disagreement about their usage.

The classic example of primary prevention within a public h
context was the history-making action in the nineteenth century o
Snow (Last, 1988), who removed the handle of the Broad Street
pump in London to halt the epidemic of cholera in the neighbor
Despite very little understanding of cause and effect, the preve
effort was successful. Gradually, the knowledge base regarding
tious diseases expanded.

In the original classification system of primary, secondary
tertiary prevention, there was an implied understanding of mecha
linking the cause of the disease with the occurrence of the disease
the time this system was developed, research has advanced our u
standing of the complexity of the association between risk facto
health outcomes. There is an increased appreciation for the impo
of the interplay among the biological, psychological, and soc
biopsychosocial, factors in the expression of a physical illness. I
most part, knowledge of the intervening mechanisms is just beg
to be understood.

Recognition of this complex interaction regarding risk and pro
factors and illness outcomes, and the lack of understanding abo
risk factors lead to or are associated with the onset of illness, som
lead to a pessimistic view that prevention efforts are futile until etio
better understood. Gordon (1987), however, was convinced that
cally oriented disease prevention and health promotion programs c
based solely on empirical relationships, and this led him to prop
alternative classification system for physical disease prevention (G
1987, 1983). The system was based on a risk-benefit point of view;
the risk to an individual of getting a disease must be weighed aga
cost, risk, and discomfort of the preventive intervention. Gordon's
consisted of three categories: universal, selective, and indicated. A
categories were meant to apply only "to persons not motivated by
suffering" (Gordon, 1983, p. 108). The three categories represen
population groups to whom the interventions were directed
whom they were thought to be most optimal.

A *universal preventive measure* is a measure that is desira
everybody in the eligible population. In this category fall a

measures that can be advocated confidently for the general public and for all members of specific eligible groups, such as pregnant women, children, or the elderly. In many cases, universal preventive measures can be applied without professional advice or assistance. The benefits outweigh the cost and risk for everyone. Examples include maintenance of an adequate diet, use of seat belts, prevention of smoking, many forms of immunization, and prenatal care.

A *selective preventive measure* is desirable only when the individual is a member of a subgroup of the population whose risk of becoming ill is above average. The subgroups may be distinguished by age, gender, occupation, family history, or other evident characteristics, but individuals within the subgroups upon personal examination are perfectly well. Because of the increased risk of illness, the balance of benefits against risk and cost can be justified. Examples include special immunizations, such as yellow fever, for individuals who travel to areas of the world where the disease is still prevalent, and annual mammograms for women with a positive family history of breast cancer.

An *indicated preventive measure* applies to persons who, on examination, are found to manifest a risk factor, condition, or abnormality that identifies them, individually, as being at high risk for the future development of a disease. The identification of persons for whom indicated preventive measures are advisable is the objective of screening programs. Gordon meant for the recipients of indicated preventive interventions to be asymptomatic regarding the disease but to have a "clinically demonstrable abnormality." Indicated preventive measures are usually not totally benign to the subject or minimal in cost. If they were, the balance in the benefit-cost analysis might favor their wider application, including segments of the population at lower risk of disease, and they would tend to move into the selective or universal classes. Examples of indicated measures include medical control of hypertension and frequent, careful examination of persons from whom a basal cell skin cancer has been removed (Gordon, 1983).

Unfortunately, over time there has been a simplistic blending of these two classification systems for the definition of prevention, that is, the original primary, secondary, and tertiary system and Gordon's universal, selective, and indicated system. At times, there even are attempts to use the three-tiered systems interchangeably. This sort of erroneous integration of terms has slipped into the prevention research field and added to the confusion regarding definitions.

Although universal prevention may at times be comparable to primary prevention, indicated measures have been compared to secondary prevention in a very narrow sense that Gordon thought was incorrect.

Further, even though the word *treatment* is often used in connection with indicated preventive measures, Gordon believed that there was a distinction between treatment and indicated prevention. Whereas the aim of treatment is to be immediately therapeutic, the aim of indicated prevention is to provide an intervention for an asymptomatic, clinically demonstrable abnormality that will result in the prevention of some later, anticipated symptoms or disability (Gordon, 1983). While others believed that this "asymptomatic, clinically demonstrable abnormality" was the first sign of illness, Gordon said that these signs were related to the biological origin of disease but were not the disease itself.

This distinction has compelling ethical ramifications. Treatment quickly provides benefits, including symptomatic relief, from an already existing diagnosable condition. On the other hand, indicated preventive interventions are based on probabilities. There is no sure way of knowing that the disease will occur, and potential benefits may be delayed for months or even years. When securing compliance from individuals for indicated interventions, these distinctions should be clarified.

## CLASSIFYING INTERVENTIONS FOR MENTAL DISORDERS

Neither the original public health classification system of primary, secondary, and tertiary prevention nor Gordon's classification system of universal, selective, and indicated prevention was designed for use in the prevention of mental disorders. Rather, both focused on prevention of disorders traditionally identified as medical disorders. The application of these terms to a mental health framework is not straightforward. One of the main problems has been the notion of "caseness" that is used in public health. It is often more difficult to document that a "case" of mental disorder exists than it is to document a physical health problem. Agreement regarding the occurrence of a case of a mental disorder varies over time with the instruments and diagnostic systems employed and with the theoretical perspective of the evaluators. Also, symptoms and dysfunction may exist even though all criteria for a DSM-III-R diagnosis are not present. Finally, the outcomes in very young children (birth to age five) are often not diagnosable as "psychiatric caseness" but rather as impairments in cognition and psychosocial development.

### The Mental Health Intervention Spectrum for Mental Disorders

Because of all the difficulties described above, the committee has chosen not to use the public health classification system of primary,

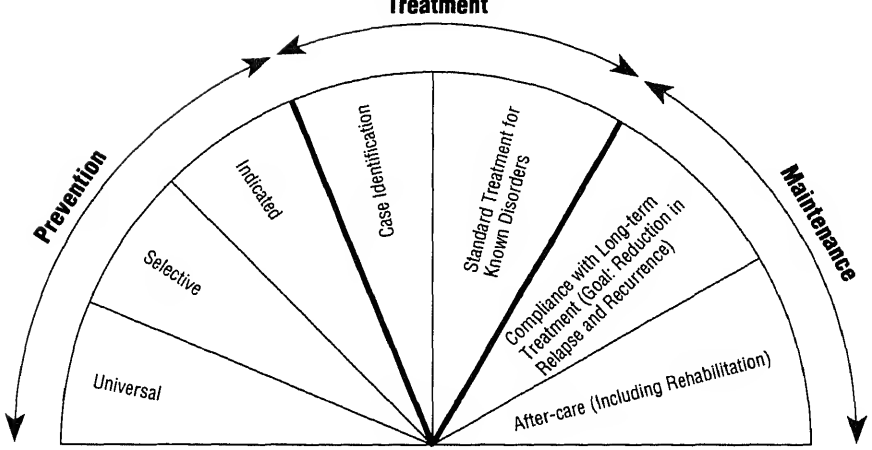


FIGURE 2.1 The mental health intervention spectrum for mental disorders.

secondary, and tertiary prevention. Rather, it presents an alternative system in which the term *prevention* is reserved for only those interventions that occur before the initial onset of a disorder. This system incorporates many of Gordon's ideas regarding prevention, including an adaptation of the concepts *selective* and *indicated*.

Although the committee's emphasis is on prevention, it realizes that a classification system is necessary that recognizes the importance of the whole spectrum of interventions for mental disorders—from prevention, through treatment, to maintenance (see Figure 2.1). Under this system, treatment interventions, which are therapeutic in nature (such as psychotherapy, support groups, medication, and hospitalization), are provided to individuals who meet or are close to meeting DSM-III-R diagnostic levels. There are two components in treatment intervention: (1) case identification and (2) standard treatment for the known disorder, which includes interventions to reduce the likelihood of future co-occurring disorders. The optimal treatment protocol aims to reduce the length of time the disorder exists, halt a progression of severity, and halt the recurrence of the original disorder, or if not possible, to increase the length of time between episodes. The clinician also aims to halt the occurrence of other disorders in the patient, a phenomenon known as co-morbidity. Some clinicians see this as a standard part of optimal treatment, whereas others view it as prevention within the original public health classification system. Maintenance interventions, which are supportive, educational, and/or pharmacological in nature, are

provided on a long-term basis to individuals who have met DSM-III-R diagnostic levels and whose illness continues (especially the more severe disorders). The two components of maintenance intervention are (1) the patient's compliance with long-term treatment to reduce relapse and recurrence and (2) the provision of after-care services to the patient, including rehabilitation. The aim of both components is to decrease the disability associated with the disorder.

By setting prevention into a context within the mental health field, this system helps to point out the fallacy of the commonly voiced idea that prevention is everywhere, in all aspects of mental health research and service. The committee acknowledges that in clinical practice the boundary between prevention and treatment is not as clear-cut as this classification system conveys. Issues of co-morbidity, relapse, and recurrence can be thought of in several ways. For example, providing lithium medication to a patient with bipolar mood disorder is clearly treatment, but if the medication reduces the number and intensity of the depressive symptoms so that the patient is no longer at risk for becoming dependent on alcohol, the intervention may also be thought of as prevention, provided before the onset of a secondary problem, in this case alcohol dependence. Also, psychotherapy for an anxious mother of a healthy child can be conceptualized as treatment of the mother as well as prevention of later difficulties in the child. Finally, effective treatment of a physical illness may prevent a secondary mental disorder and vice versa.

While it is laudable for clinical practice to consider both treatment and prevention outcomes, this report focuses on prevention research as a separate entity. The change in terminology that is used throughout this report, although perhaps not particularly useful to clinicians, who may find themselves providing elements of prevention, treatment, and maintenance to the same patient, is critical to a review of prevention research. Without a system for classifying specific interventions, there is no way to obtain accurate information on the type or extent of current activities, either public or private, and no way to ensure that prevention researchers, practitioners, and policymakers are speaking the same language.

## Preventive Interventions for Mental Disorders

In the mental health intervention spectrum, *universal preventive interventions* are targeted to the general public or a whole population group

immunization, which have preventive effects not only for physical health but also for mental health, are examples, as is a program designed to prevent distress and divorce in couples who are married or planning marriage and are not currently experiencing difficulties in their relationship. All are described in Chapter 7 of this report. Universal interventions have advantages when their cost per individual is low, the intervention is effective and acceptable to the population, and there is a low risk from the intervention. However, it is crucial to be realistic about costs. An intervention provided to every prospective marital couple, although low in cost per couple, would be very expensive overall because of the size of the target group.

*Selective preventive interventions* for mental disorders are targeted to individuals or a subgroup of the population whose risk of developing mental disorders is significantly higher than average. The risk may be imminent or it may be a lifetime risk. Risk groups may be identified on the basis of biological, psychological, or social risk factors that are known to be associated with the onset of a mental disorder. Examples of selective preventive interventions include home visitation and infant day care for low-birthweight children, preschool programs for all children from poor neighborhoods, and support groups for elderly widows (see Chapter 7). Selective interventions are most appropriate if the interventions do not exceed a moderate level of cost and if negative effects are minimal or nonexistent.

*Indicated preventive interventions* for mental disorders are targeted to high-risk individuals who are identified as having minimal but detectable signs or symptoms foreshadowing mental disorder, or biological markers indicating predisposition for mental disorder, but who do not meet DSM-III-R diagnostic levels at the current time. The term *indicated* is used differently here from how Gordon originally meant for it to be applied. Whereas he meant it to apply only to asymptomatic individuals, within this mental health classification system it can be applied to asymptomatic individuals with markers as well as to symptomatic individuals whose symptoms are still early and are not sufficiently severe to merit a diagnosis of a mental disorder. An example of an indicated preventive intervention from this report is a parent-child interaction training program delivering an intervention for children who have been identified by their parents as having behavioral problems (see Chapter 7). Indicated interventions may be reasonable even if intervention costs are high and even if the intervention entails some risk.

Indicated preventive interventions are often referred to by clinicians as *early intervention* or an early form of treatment. One danger in this classification system is that individuals needing treatment interventions

could be intentionally misclassified as needing indicated preven interventions because of ethical concerns about labeling. Interveners sometimes reluctant to apply diagnostic labels, especially to childr even when such diagnoses and their corresponding treatments appropriate.

A critical component of universal and selective preventive interv tions is that although some members of the group may have me disorders when the intervention begins, this information is not relev to the choice of the targeted groups. If individuals are chosen fo preventive intervention because of early psychological symptoms, definition the intervention is an indicated one.

The overall aim of the three types of preventive interventio universal, selective, and indicated—is the reduction of the occurrenc new cases. Usually, this is done through a risk reduction model, a even if outcomes are in the distant future and the goal of fewer cases not yet been established, the decrease in risk and/or increase protective factors can be documented. Another aim might be the de of onset of illness and the short-term reduction of new cases in addit to the absolute prevention of new cases. Additionally, the aims indicated preventive interventions might be to reduce the length of ti the early symptoms continue and to halt a progression of severity so t the individuals do not meet, nor do they come close to meeti DSM-III-R diagnostic levels. Even if the individual does eventua develop a DSM disorder, the prior preventive intervention may s have had an effect by reducing the duration and/or severity of disorder.

Obviously, it is preferable to prevent a disorder throughout life, the delay of onset of a disorder is also a worthwhile goal of preventi Delay of onset has the potential for benefits not only to the individ but also to the family. For example, reducing the number of new ca of depressive disorder in mothers during their childrearing years m have a major effect on the incidence of depression in their children, ev if, after the children leave home, the incidence of depressive disorders these mothers returns to the usual level. Likewise, the delay of onset Alzheimer's disease would result in a delay in the stress-induc problems experienced by family caregivers.

## MENTAL HEALTH PROMOTION

The phrase *promotion of mental health* has definitional problems simi to those of *prevention*, meaning different things to different peop Norman Sartorius (1988, p. S3), director of the Division of Mental Hea

at the World Health Organization, noted that "For some, it means the treatment of mental illness; for others, it means preventing the occurrence of mental illness; and for others, promotion of mental health means increasing the ability to overcome frustration, stress, problems, enhancement of resilience and resourcefulness."

The committee has chosen not to include mental health promotion within the spectrum of interventions focused on mental disorders. Nevertheless, the committee recognizes that mental health promotion activities are important and widespread. The reason for not including it within the above spectrum is that health promotion is not driven by an emphasis on illness, but rather by a focus on the enhancement of well-being. It is provided to individuals, groups, or large populations to enhance competence, self-esteem, and a sense of well-being rather than to intervene to prevent psychological or social problems or mental disorders. This focus on health, rather than illness, is what distinguishes health promotion activities from the enhancement of protective factors within a risk reduction model for preventive interventions. (See Chapter 9 for a theoretical grounding in this perspective on health promotion.)

## THE CLASSIFICATION SYSTEM IN PRACTICE

The committee's classification system can be applied to all research and service related to interventions for mental disorders. All three types of intervention—prevention, treatment, and maintenance—are fully compatible with empirical design and measurement and can yield important findings.

As mentioned above, the boundaries between prevention and treatment can be blurred in clinical practice. The same has been true in prevention research. The U.S. Public Health Service's 1984 definition of prevention research includes "only that research designed to yield results directly applicable to interventions to prevent occurrences of disease or disability, or the progression of detectable but asymptomatic disease." The lack of description of "occurrence," "disease," and "disability," as well as a breakdown of activities into "intervention," "preintervention," and "prevention-related research" (see Table 2.1), has led to a wide range of activities being labeled as prevention research. For example, a report to Congress from the Alcohol, Drug Abuse, and Mental Health Administration used this definition to justify the inclusion of everything from basic research to community support programs for the rehabilitation of the seriously mentally ill in its prevention research portfolio (ADAMHA, 1990). The committee recognizes that government officials value the flexibility and broader definition given

TABLE 2.1 U.S. Public Health Service Definition of Prevention Research

*Prevention Research:* Prevention research includes only that research designed to yield results directly applicable to interventions to prevent occurrences of disease or disability, or the progression of detectable but asymptomatic disease.

**Pre-intervention**

- Identification of risk factors for disease or disability
- Development of methods for identification of disease controllable in the asymptomatic state
- Refinement of methodological and statistical procedures for quantitatively assessing risk and measuring the effects of preventive interventions

**Intervention**

- Development of biologic interventions to prevent occurrence of disease or disability, or progression of asymptomatic disease
- Development of environmental interventions to prevent occurrence of disease or disability, or progression of asymptomatic disease
- Development of behavioral interventions to prevent occurrence of disease or disability, or progression of asymptomatic disease
- Conduct of clinical and community trials and demonstrations to assess preventive interventions and to encourage their adoption

Some interventions may be applicable to primary prevention as well as to disease treatment (e.g., diet and exercise as components of rehabilitation for coronary heart disease). Research into such interventions is considered prevention research.

*Prevention-related research:* More broadly defined, prevention research also includes that research which has a high probability of yielding results which will likely be applicable to disease prevention. Included are studies aimed at elucidating the chain of causation—the etiology and mechanisms—of acute and chronic diseases. Such basic research efforts generate the fundamental knowledge which contributes to the development of future preventive interventions.

them and that they are uneasy about targeted mandates from Congress. The committee also recognizes the importance of the whole continuum from basic sciences through treatment research and supports continued research in areas along the entire continuum. However, a too-inclusive definition of prevention research often underlies a neglect of interventions to reduce risks. Therefore the committee presents an alternative, using the term *prevention research* to refer only to preventive intervention research that can be further classified into universal, selective, and indicated types.

In service, these three general preventive intervention strategies can be integrated within an overall public health plan and are likely to occur in primary health care settings, schools, work sites, churches, and other community settings. For example, universal interventions can be ap-

plied when a program is believed to be beneficial for the general public and the benefits outweigh the costs and risks. Targeted campaigns can be mounted to implement selective preventive interventions for high-risk groups and for those individuals with high imminent or lifetime risk factors when the balance of benefits against risk and cost can be justified. Should individuals at risk begin to show early symptoms of the disorder, they would be candidates for an indicated preventive intervention program designed to avert the full-blown manifestation of the disorder through more intensive and focused preventive strategies. In a public health approach, each level of preventive intervention would be keyed to the nature of the target population's needs for reducing risk factors and strengthening protective factors.

Also within the public health care plan, adequate treatment and after-care interventions need to be readily available for those who have not had access to preventive interventions or for whom the interventions were not effective in preventing the onset of a mental disorder. Although the focus in this report is on prevention, the other components of the classification system outlined here deserve equal emphasis in a comprehensive and coordinated new approach to our nation's mental health.

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# LESSONS FROM HEALTH RESEARCH

# 3

# Prevention of Physical Illness

Major advances in the prevention of health-related problems have been made during recent decades in several areas of physical health (DHHS, 1991). Broad-based governmental actions as well as communitywide preventive intervention programs based on sound experimental research designs have produced significant changes in the health behaviors of many individuals, and declines in the risk of morbidity and premature mortality have been achieved. Progress has been notable in many areas, including the three used here as illustrations: cardiovascular disease risk reduction, smoking cessation and prevention, and injury prevention. The universal preventive strategies mounted in these areas have demonstrated that effective interventions are possible even when knowledge about the mechanisms causing illness is incomplete. Two experiments on cardiovascular disease risk reduction are reviewed, as is a series of experiments on smoking cessation. For injury prevention, a different approach is taken; rather than describing experiments, the effects of broad-based governmental action are reviewed.

The successful prevention campaigns in physical health can serve in several ways as a bridge in building effective mental health interventions. They provide powerful analogies and models for developing general strategic guidelines on approaches to prevention. In addition,

This chapter is based, in large part, on presentations at a workshop, convened by the Institute of Medicine, that focused on findings from prevention programs in physical health that might be applicable for mental health. (See Appendix C for participants and agenda of the meeting.)

the prevention programs in physical health can be directly useful suggesting approaches and techniques—such as media presentati and strategies for community organization—that have proved t value in the physical health arena and may be readily modified adapted to mental health.

## CARDIOVASCULAR DISEASE

Cardiovascular disease, one of the leading causes of premature de and disability in the United States, is linked by extensive research variety of life-style components peculiar to the industrialized twent century. Smoking, little or no exercise, diets high in saturated fat cholesterol, and chronic stress can lead to high blood pressure, h blood cholesterol, and obesity, all of which increase risk of cardio cular disease.

Investigators at Stanford University have conducted two major st ies designed to reduce the risk of cardiovascular disease. The prevent campaigns are based on the conviction that health risk factors associa with life-styles are most readily modified in the context of the comm nity environment. It is important to note that although a connect between high fat intake, high cholesterol, and cardiovascular dise was reasonably well established by longitudinal data when the firs the Stanford studies began, the relative risk for cardiovascular dise (the ratio of the risk of disease or death among the exposed to the among the unexposed) had not been established experimentally, the amount of change, or malleability, in the risk factors that achievable from a community campaign was certainly not known.

The prevention programs—called the Stanford Three-Commu Study and the Stanford Five-City Project—have demonstrated nota success in risk factor reduction through preventive interventions bef the onset of illness. The results are promising because they suggest t it is possible to change the health habits of entire communities and mobilize existing community resources to achieve those changes. studies have become prototypes for comprehensive programs planned social change to prevent many chronic diseases and other so problems (Flora, Maccoby, and Farquhar, 1989).

The goals of the Three-Community Study were to produce awaren of the probable causes of cardiovascular disease and of the spec measures that may reduce risk and to provide the knowledge and sk necessary to accomplish and maintain recommended behavior chang The study encouraged reduction in body weight through caloric red tion and increased physical activity, and dietary changes to red

intake of saturated fat, cholesterol, salt, sugar, and alcohol. Cigarette smokers were educated on the need and methods for ceasing or at least reducing their daily consumption.

Mindful of the powerful cultural forces that reinforce personal health habits, the investigators designed the study to combine an extensive mass media campaign with a considerable amount of face-to-face instruction. They also used three elements that had traditionally been ignored in health campaigns: (1) mass media materials devised to teach specific behavioral skills, as well as to offer general information to affect attitude and motivation; (2) the mass media approaches and, in particular, the face-to-face methods of instruction that were solidly grounded in theory and employed established social learning methods of achieving changes in behavior and principles of self-control training; and (3) an extensive analysis of the knowledge deficits and the media-consumption patterns of the intended audience, which was used to influence the campaign's ultimate design (Farquhar, Maccoby, Wood, Alexander, Breitrose, Brown et al., 1977).

The Three-Community Study was carried out from 1972 through 1975 in a trio of northern California towns: one received the intense media campaign and the face-to-face education, another just the media communications, and one served as a control. The media campaign consisted of about three hours of television programming, 50 television spots shown repeatedly, several hours of radio programming, weekly newspaper columns, newspaper advertisements and stories, billboards, posters, and printed material mailed to participants. The media materials incorporated elements of modeling and specific skill-building components designed to achieve participatory learning, which the investigators considered more effective than passive learning in promoting and maintaining behavior changes. For example, a televised hour-long "Heart Health Test" used self-scoring followed by instructions on how to reduce that particular risk, and another TV program modeled steps in preparation of healthful food alternatives. A specially tailored media campaign also was created for the sizeable populations of Spanish speakers in the communities. In the face-to-face component of the program, individuals identified as being at especially high risk received eight lessons (totaling 15 hours) of skills training, conducted in both group classes and at-home sessions and directed by expert counsellors trained in behavior modification techniques.

During its two-year period of active community education, the project achieved a statistically significant reduction in the composite risk score for cardiovascular disease, a result of significant declines in blood pressure, smoking, and cholesterol levels. The risk score decreased

approximately 25 percent for the media-only community and 30 perc for the community receiving the combined campaign (Farquhar et 1977). Overall, the Three-Community Study demonstrated that (1) i feasible to reach many individuals as opposed to targeting only high-r individuals; (2) media-based strategies can be highly effective, but even more so when supplemented with face-to-face communicati and (3) maintenance of the program requires mobilization of community in addition to changes in individual behavior.

The Stanford Five-City Project extended the scope and objectives the pioneering Three-Community Study, in particular by emphasiz community organization and including independent population s veys. It was a low-cost, comprehensive, communitywide program w the main goal of reducing risk of cardiovascular disease (Farquh Fortmann, Maccoby, Haskell, Williams, Flora et al., 1985). Other ob tives included analysis of cost-effectiveness, development of educatio and community organization methods, and gradual transfer of progr control to community organizations.

Over a five-year period beginning in 1980, two medium-sized Calif nia cities received continual exposure to general education punctua by four or five separate risk factor education campaigns per y (Farquhar, Fortmann, Flora, Taylor, Haskell, Williams et al., 19 Three similar cities served as a control group, with the combi population of all sites reaching approximately 350,000. Education w carried out through the electronic and print media, and directly throu classes, contests, and correspondence courses. Special programs w developed for Spanish-language radio, newspapers, and ma distributed print materials.

In addition, school-based programs for grades 4, 5, 7, and 10 includ special sessions on nutrition, exercise, and smoking, as well as mu factor risk reduction classes for teachers and administrators and ma rials on exercise and nutrition for the students' parents. Work pla were another major focus, and many large businesses participated disseminating printed information, offering workshops and class sponsoring contests, and assessing environmental risks (such as sm ing policy and exercise facilities). Heath care professionals participa in training programs, disseminated printed materials, and implemen risk reduction programs in their practices. There also were numero point-of-purchase efforts. For example, many restaurants, cafeteri and grocery stores participated in specially designed health food p grams, such as a menu-labeling program that stressed the importa and versatility of low-fat foods.

The project's results proved quite encouraging. They definitiv

demonstrated the effectiveness of the intervention in reducing risk factors and suggested that similar programs could be tried. Although knowledge of risk factors increased in both the experimental and the control cities, the improvement in the experimental group was significantly greater in all follow-up surveys.

The knowledge apparently was put into practice, too. After 30 to 64 months, the experimental group registered an overall decrease in cardiovascular risk scores by 16 percent and a decrease in total risk score by 15 percent (Farquhar et al., 1990). On closer analysis, significant net reductions in community averages favoring the experimental group occurred in cholesterol level (about 2 percent) and blood pressure (4 percent). There also was a large decline in smoking level (13 percent) among the experimental group.

The decreases in cholesterol and blood pressure, although minor by clinical standards, may in fact have a potentially large public health significance (Farquhar et al., 1990). Because changes are greater in those at high risk and these changes apply to the entire population, a significant decline in the total number of cardiovascular disease events could be anticipated. The behavioral changes are also potentially sustainable and may even spread to other individuals as the changes are woven into the fabric of the community.

Not only effective, the campaign proved affordable. Over the project's span, each adult was exposed to an average of 527 educational episodes distributed fairly evenly over time—for a total exposure of about 26 hours per adult (Farquhar et al., 1990). Of these messages, about 70 percent were sent through television and radio, principally as 30-second spots. Annual radio and television exposure thus would be less than one hour per adult. The organizational and educational program was delivered at a per capita cost for adults of about $4 per year, excluding research costs.

Just as important as the specific details of the program are some broader issues that guided its development and implementation. For example, like its three-city predecessor the project was based on well-established models and theories. It effectively incorporated a communication-behavior change model, social learning theory, community organization principles, and social marketing methods. The program was designed to be comprehensive, encompassing multiple channels of communication, multiple objectives, and multiple targets of change (individuals, organizations, and larger community networks). It was also carefully evaluated at several stages, including pretesting the educational materials and conducting field assessments of whether the intended audience actually received the information.

## SMOKING

Smoking kills approximately 434,000 Americans each year—more than the number who die from automobile crashes, fire, alcohol, homicide, suicide, drugs, and AIDS combined. In 1990, roughly 45.8 million persons age 18 or older, 25.5 percent of all adults, smoked cigarettes (CDC, 1992a). Young people smoke at about the same rate, which means we are replacing all the adults who either die or stop smoking with new smokers.

The picture would be even more grim were it not for major societal actions to discourage smoking. In the 1950s a series of epidemiological studies began to yield evidence that cigarette smoking could indeed cause lung cancer, as thoracic surgeons had been asserting for more than a decade (Breslow, 1982). Additional evidence accumulated, and in 1964 the Surgeon General of the U.S. Public Health Service issued *Smoking and Health*, which marked a watershed in alerting the public to the health hazards of tobacco (U.S. Public Health Service, 1964).

Since then, various organizations have conducted a large number of prevention programs, and there has been a series of public policy actions aimed at reducing smoking, such as restricting advertising, increasing public education, and requiring warning labels on tobacco products. These and other actions have produced a steady decline in smoking. From 1965 through 1985, smoking prevalence among adults dropped an average of 0.5 percentage points annually, and from 1987 through 1990 the decline averaged 1.1 percentage points annually (CDC, 1992a). Overall, the decline in smoking has been steady, with the exception of a minor increase of 0.3 percent between 1990 and 1991. This increase was not statistically significant, and the 1992 prevalence rate was below the prevalence rate of 1990 (SAMHSA, 1993). In 1989 the Surgeon General issued *Reducing the Health Consequences of Smoking: 25 Years of Progress* (DHHS, 1989). While reporting on dramatic changes in smoking behavior, he alerted the public to the need to focus increased efforts on preventing smoking initiation and encouraging smoking cessation among high-risk populations.

There have been some problems along the way, however, that are relevant for planning prevention efforts in mental health. Thomas Glynn of the National Cancer Institute's (NCI) Smoking, Tobacco, and Cancer Program has argued that, although there has certainly been success in reducing tobacco use, the early research and control activities did not provide the information necessary for even broader reductions (Glynn, 1991). That is, the series of intervention studies in the 1970s never were drawn together into a comprehensive plan of attack. Various reasons are

cited for this, including competing or poorly coordinated funding agency priorities, inadequate research methodologies, lack of communication across disciplines, and an insufficiently coordinated data base. In addition, most investigators focused only on single causes of smoking (such as physical dependence on nicotine) or made use of single communication channels (such as mass media or physician office-based programs) for prevention.

Faced with this scattershot approach, NCI launched in 1982 the Smoking, Tobacco, and Cancer Program (STCP), a major planning and research effort to coordinate smoking prevention trials and develop large-scale comprehensive community interventions (Glynn, 1991). Lacking a consensus on how best to persuade people to quit or not begin smoking, the STCP mounted a well-planned, carefully phased three-phase campaign.

First, program administrators consulted with hundreds of experts to identify areas in which significant gains could be expected. They then called for and funded research to develop and evaluate prevention and cessation interventions that would be effective, cost efficient, durable, generalizable, and widely applicable. Between 1984 and 1987, NCI began 49 large trials, most of which were to last five years, at a total cost of $82 million.

Reflecting the multifactorial emphasis, these trials covered eight areas. First, there were school-based interventions with adolescents. These recognized that whatever can be done to prevent smoking by young people is doubly important, not only because it minimizes tissue damage during youth but also because it minimizes the hazard of addiction (few people start smoking after age 20, and those who do so may be less prone to addiction). There were self-help programs, based on the observation that 90 to 95 percent of all people who have stopped smoking claim they quit on their own. There were interventions conducted by physicians and dentists, who were considered a greatly underutilized resource. There were mass media interventions, which adopted many of the concepts developed in the Stanford cardiovascular risk programs. And there were interventions focused on four special populations: African-Americans, Hispanics, women, and smokeless tobacco users. At the time these trials began, the attributable risk of smoking (the rate of a disease or other outcome in exposed individuals that can be attributed to the exposure) had been fairly well established through epidemiological studies, although data were stronger for lung cancer than cardiovascular disease. There were few data, however, on the level of effect that the various types of interventions might have on smoking rates.

research efforts and their readiness to be applied on a larger scale, STCP consulted on a regular basis with the various investigators maximize cross-fertilization. As each trial area concluded, the ST convened the principal investigators and their key staff. These meeti resulted in a series of consensus statements based on the empir research, which have been used to select specific prevention a cessation activities to be further explored in the second and third pha of the program.

One example of the studies conducted during the first phase v school-based interventions, of which NCI funded 10 program tri They covered both public and private schools, from elementary to h school levels. Some aimed at developing new curricula, some at revis existing curricula, and some at conducting long-term follow-up eval tions. When the investigators convened after the trials concluded, th agreed that school-based smoking prevention programs had had c sistently positive effects, although the effects were modest and limited scope.

The programs have been particularly effective in delaying the onse tobacco use, but less successful in targeting use by high-risk a minority groups (Glynn, 1989). This should perhaps come as no s prise, given the barrage of advertising and media exposure that child steadily receive. For example, a recent study concluded that by the ti U.S. children are six years old, they can just as easily identify "Old the Camel," a cartoon character frequenting cigarette advertisements they can identify the logo for Mickey Mouse (Fischer, Schwartz, a Richards, 1991). Educational strategies to overcome such influences a boost success rates remain to be investigated, but may include ear intervention and more frequent interventions throughout the jun high and high school years.

The second phase is a $45 million effort called the Commun Intervention Trial for Smoking Cessation (COMMIT). Beginning October 1988, a number of comprehensive community-based interv tions (incorporating lessons from the first-phase studies) are be tested in 11 communities in North America, against the same numbe control communities. The third phase, which will incorporate findi from the first two, will be the American Stop Smoking Intervention T for Cancer Prevention (ASSIST). This $150 million effort is set to begi the fall of 1993. It will introduce large-scale interventions, emphasiz coalition development and policy change, in 17 states (reaching m than 50 million people), with work being carried out by state and lo health departments. NCI believes that this sharply focused and coo

nated strategy is the only means by which the nation will achieve further reductions in tobacco use (Glynn, 1991).

## INJURIES

Injuries are the leading cause of death among Americans up to 44 years of age (IOM, 1985). Because they strike younger people disproportionally—children and teenagers are common victims—injuries also are the nation's leading cause of years of potential life lost through age 65. Of the approximately 150,000 persons who die from injuries each year, roughly one third are victims of intentional violence (homicide and suicide), one third die in motor vehicle crashes, and one third are killed by falls, burns, poisoning, drowning, and other unintentional injuries (CDC, 1992b). Many more persons are injured than killed. In 1987, a total of 62 million injuries caused Americans to restrict their activities for more than 600 million person-days and spend nearly 200 million person-days in bed (Brown, Foege, Bender, and Axnick, 1990).

When talking about preventing injuries, the first thing to note is that injuries are not "accidents." Too often, injuries are described as events that "just happen," unfortunate acts of fate beyond understanding and therefore beyond control. On the contrary, injuries are understandable, predictable, and potentially preventable. Indeed, given their importance in causing morbidity and mortality, injury prevention is increasingly becoming the focus of public health programs.

Among the most notable has been the effort to improve motor vehicle safety. The National Highway Traffic Safety Administration, led by its first administrator, William Haddon, launched a major initiative in the 1960s. When the program began, there was no consensus about the relative values of various intervention options. Would, for example, seat belts save more lives than vehicle modifications or driver education? Would seat belt use cause injuries? What was clear, however, was the very strong connection between driving a motor vehicle and sustaining motor-vehicle-related injuries.

The agency moved ahead with a variety of prevention programs—often in the face of considerable opposition from the automobile industry and other groups with vested economic interests. The efforts addressed the numerous factors that can play a role in causing injuries or contributing to their severity, and targeted a spectrum of audiences, including individuals, communities, businesses, regulatory agencies, and legislators. This comprehensive, well-coordinated campaign has yielded a range of safety-related advances, including increased use of seat belts; decreased drunk driving; better design and construction of

highways and roadside structures; increased pedestrian, motorcyc bicycle, and commercial vehicle safety; and engineering improveme in automobiles and trucks.

Promoting seat belt use, for example, was a particularly importa component of the national safety program, and strategies to prom their use have included both mandatory-use state legislation and couragement through public education campaigns. Investigators asse ing these efforts have found that automobile fatalities have declin markedly as a consequence of increased seat belt use. They also ha observed that enforcement of seat belt laws has proved necessary ensure continued compliance with the laws (IOM, 1989; Campbell, 19 Williams and Lund, 1988).

Overall, prevention campaigns have led to a decline in traffic fatalit by approximately 30 percent since the mid-1960s. Moreover, given steadily increasing numbers of vehicles traveling many more miles, i estimated that approximately 115,000 Americans would now be losi their lives in motor vehicle crashes each year if death rates common the 1960s had not been reduced by the various safety interventions (U National Highway Traffic Safety Administration, 1991).

From these years of experience, Haddon led other investigators developing systematic ways to categorize prevention strategies that m extend well beyond injuries or highway safety. One result is called Haddon Matrix (Haddon, 1972). This concept holds, among otl things, that with any injury, there is a triad of factors at work: hum factors, factors involving the vehicle and related equipment, and fact involving the physical and social environments. Each of these ar represents an opportunity to devise a prevention strategy. This ch lenges today's investigators not to become focused on any single optic but to think freely and fully about a range of possibilities. And it mea fostering cooperation among a variety of scientific disciplines, becau finding solutions to complex problems typically will require a w range of experience and skills.

To break the chain of injury causation, investigators also ha learned that it is best to aim at the weakest link first—that is, target areas on which the greatest impact can be made for the small expenditure. In preventing injuries, this typically means modifyi products or the environments in which they are used, rather th trying to modify human behaviors. For example, designing hot wa heaters that do not circulate scalding water is more effective th mounting programs to remind millions of parents to be ever vigilant not letting their children take unsupervised baths. This focus does deny the success of behavior modification in other fields, but it do

reflect an awareness that persistent behavioral changes are very hard to maintain.

Although all modes of injury need further investigation, one that is especially demanding—and perplexing—is violence, now recognized as a major national public health problem. Violence is linked with mental health in several ways. First, of course, violence begets mental health problems: victims of violence often experience severe emotional and psychological disturbances. Second, achieving a better understanding of mental disorders can help inform efforts to prevent such violent acts as homicide and suicide. Intertwined in this issue as well is the frequent association of alcohol and drugs with violent or abusive behavior.

Researchers have addressed the problem of violence in a number of studies. For example, there is evidence from studies conducted across societies and within societies that exposure, especially among some impressionable children and youths, to scenes of aggression and violence on television and in other media fosters our acceptance and expectation of violence in America and probably contributes to the frequency of aggressive acts themselves (Rosenberg, O'Carroll, and Powell, 1992). Studies also indicate that children who witness violence directly—an increasingly frequent situation in many urban areas—often develop symptoms associated with post-traumatic stress disorder, including diminished ability to concentrate in school, persistent sleep disturbances, disordered attachment behaviors with parents or significant caregivers, and changes in orientation toward the future that lead to increased risk-taking behaviors (Groves, Zuckerman, Marans, and Cohen, 1993). Children who witness domestic violence may be particularly vulnerable to emotional and developmental problems. Many aspects of the causes of violence and how violence can be prevented remain to be empirically tested, however, and the problem is presented here primarily to illustrate a broad-scale beginning in tackling one of the most destructive and powerful problems in society today, and one with important implications for prevention of mental disorders.

The Centers for Disease Control and Prevention (CDC) is now conducting a multifaceted community-based research effort devoted to youth violence prevention (Rosenberg et al., 1992). Multifaceted programs are needed because of the complex web of factors that cause violence and violence-related injuries, and community-based programs are needed to ensure community residents' involvement in, ownership of, and responsibility for the activities. Six key strategies have been identified, representing an orderly progression of research and implementation. The strategies are (1) developing prevention materials; (2) establishing community demonstration programs; (3) rigorously evalu-

ating specific preventive interventions; (4) training public health wo
ers, community members, and health professionals in violence prev
tion; (5) continuing surveillance, risk factor research, and evaluati
and (6) strengthening the capacity of state and local health departmer

The CDC investigators will first help local workers describe and def
the problems of violence in their community and then select appropri
interventions. Toward these ends, specialized prevention materials
being developed, including a guidebook called *Prevention of Youth Viole
A Framework for Community Action* (CDC, 1993). This guidebook clea
spells out some relatively simple actions (though not all have been test
that communities can adopt on their own to reduce violence. The n
steps will be to help communities implement the interventions and ther
evaluate the interventions and the overall program.

One facet of violence that has proved especially intractable involv
firearms, particularly handguns. Firearm mortality dominates U.S.
tentional injury statistics, accounting for 61 percent of all homicides a
59 percent of suicides, with the burden falling most heavily on mino
and disadvantaged populations (Prevention of Violence and Inju
Due to Violence, 1991). For years, this issue had been approach
strictly as a political or philosophical matter, with the debate polariz
into those who favored some form of gun control and those who w
against it. Beginning in the early 1980s, the CDC set about to change
nature of the debate by studying the problem scientifically, beginn
with epidemiological studies, moving to analyses of risk factors a
possible causes, and then developing an array of possible interventi
and looking at their effectiveness.

Many of the studies are reviewed elsewhere (Taubes, 1992).
example, researchers learned that firearm attacks on family memb
and intimate acquaintances are at least 12 times more likely to resul
death than are assaults using other weapons. When a woman is kil
with a gun, the attacker is five times more likely to be her spouse,
intimate acquaintance, or a member of her family than to be a strang
In another study, researchers compared overall rates of assaults, ho
cides, and suicides in two cities—Seattle and Vancouver—that w
strikingly similar in all aspects but one: handguns were much easie
obtain in Seattle. The cities turned out to have similar levels of crimi
activity, but homicide was 60 percent higher, and homicide by firear
was 500 percent higher, in Seattle than in Vancouver. Building on su
studies, researchers are evaluating the effects of common approache
preventing firearm injuries—including such interventions as prohibit
of carrying guns in public, restrictive licensing, waiting periods
obtaining guns, and harsher sentences for crimes committed with gu

Although conventional and innovative interventions remain to be more fully explored, some actions already have been proposed (Rosenberg et al., 1992). There is little controversy regarding children having unsupervised access to loaded guns—it is clear that controlling access to weapons can significantly limit accidental death among adolescents who may be suicidal or prone to impulsive acts. Alternatively, handguns themselves can be modified to reduce some of their lethal potential. For example, Smith & Wesson once manufactured a handgun advertised as being child-proof. Now discontinued, the gun could be fired only by depressing a special lever, which a child's hand would not be large enough or strong enough to accomplish. Such actions can begin to save countless lives as we develop and test effective and acceptable methods of reducing ready access to the most dangerous types of guns. Again, programs to break the chain of causation of injuries should be aimed at the weakest link, and modifying products and environments (for example, limiting access to guns) might yield the greatest impact.

## FINDINGS AND LEADS

The underlying message from the prevention efforts in cardiovascular disease, smoking, and injuries reviewed here, of course, is that prevention can and does work—people have avoided injuries, reduced cardiovascular risk rates, and quit or never started smoking cigarettes. Some adults and youth have modified their life-styles as a result of multifaceted change strategies directed at individuals, groups, organizations, and communities. And people often have adopted such changes in the face of countervailing pressures, because the health habits altered are influenced heavily by social norms, peers, and environmental and economic factors. Paying close attention to the road signs these efforts have posted will help speed the journey that we must begin—immediately and together—toward preventing mental disorders and promoting mental health.

Other general lessons that, if carefully selected and applied, will contribute to success in developing mental health interventions include the following:

- **Preventive interventions for specific disorders are typically developed through a series of phases, each step building on its predecessor and supporting its successor.** The general stages are (1) recognizing and defining the problem; (2) delineating the risk factors involved; (3) conducting more detailed studies to describe the relative power of different risk factors, individually and in combination, and to describe

protective factors; (4) developing and testing a variety of approaches intervention to decrease risk and increase protection; (5) conducti large-scale confirmatory studies of the most promising interventions; implementing and evaluating the interventions in large-scale demo stration projects at multiple sites; and (7) transferring the knowled gained from the intervention programs into the public domain as wide and rapidly as resources allow.

Many areas of mental health are at the early stages of this develo ment (that is, definition of risk factors), and longitudinal studies an other research efforts are only beginning to identify causal pathway Some disorders, however, are ready (or nearly so) for various types experimental preventive trials to begin. This report will identify whe numerous disorders stand along this learning curve, which may help i planning the most appropriate next steps.

- **Preventive interventions need not always wait for complet scientific knowledge about etiology and treatment.** There is a distinc tion between knowing how to *treat* a disorder and knowing how t *prevent* it. Having effective treatment is not always necessary for effectiv prevention. For example, treatments for AIDS and fetal alcohol syn drome remain under active investigation, yet successful prevention i already possible. In addition, although there is no totally satisfactory treatment for lung cancer, smoking cessation interventions have proved effective.

Similarly, the fundamental biological mechanisms at work when a risk factor is associated with an adverse outcome may or may not be completely understood before undertaking prevention, or the relative importance of the risk factors may not be fully known. Indeed, preven- tive intervention trials—based on sound scientific theory and carefully conducted and evaluated—may themselves help to delineate mecha- nisms and to quantify the relative impact of various risk factors.

The Stanford group's program illustrates the value of this approach to prevention. Consider one risk factor: cholesterol. When the program began in 1970, scientists had established that there was a connection between high cholesterol levels in the body and increased risk of heart attack. They theorized that excessive dietary cholesterol might cause elevated levels in the body, which in turn might raise blood pressure, but they did not know precisely what effect reducing dietary cholesterol would have on cholesterol levels in the body, or what effect dietary change would ultimately have on rates of morbidity and mortality. Their solution was to target a constellation of related risk factors and employ a variety of intervention methods, and then determine the combined effect on health status. The immediate goal was achieved: promoting

behavioral changes decreased risk of disease. The long-term goal of decreasing overall mortality requires further assessment. Over the years, researchers have delineated many of the mechanisms and relative risks involved—but had the Stanford group waited for fuller understanding of how and to what degree risk factors had an effect, their prevention insights might have been delayed by a decade or more.

In addition, in classic epidemiological terms, the amount of morbidity and mortality from vehicular injuries that could be affected by Haddon's proposed changes was certainly not known at the time intervention policies were adopted. But to wait until those studies had been done would not have been nearly as useful as what he did, which was to advocate and implement changes and to study carefully their effects—another example of the use of a prevention strategy both as an intervention and as an investigative tool.

- **Preventive interventions should be based on well-established theoretical frameworks.** A scientific theoretical orientation to the causation and mechanisms of a disorder is helpful in identifying "targets of opportunity" where intervention may best take place, and a developmental theoretical orientation helps in deciding when throughout an individual's development to direct intensive intervention.

Established theories also should guide how interventions are conducted. For example, many programs have used the principles of social learning theory. This model of self-directed behavior change assumes that people are able to regulate their own behavior and to participate actively in the learning and application of behavior change skills. The components of self-directed change include problem identification, goal setting, training in self-monitoring, and active training in the skills needed both to make changes and to avoid relapses. A cornerstone of the theory is that active practice of a new skill is more likely to achieve lasting change than is written or verbal persuasion or watching other people acting as models of a new behavior (Farquhar, Fortmann, Flora, and Maccoby, 1991). Social marketing principles then can help bridge the gap between theories and action. Among other things, social marketing calls for developing messages, products, or services from the perspective of the consumer, which allows the campaign designer to tailor messages to specific audiences.

- **Preventive interventions typically are most effective when they consider multiple domains of intervention.** This means using numerous communication channels to reach a variety of people repeatedly with a range of educational materials. The idea is that individuals are more likely to adopt new behavior if encouraged to do so in many ways and from many directions.

The Stanford program, for example, incorporates a wide range communication channels—from electronic and print mass media face-to-face personal counseling and mediated group sessions, fro billboards and grocery store displays to the latest technologies interactive personal computer systems and laser discs. Moreover, t components reinforce each other wherever possible; radio spots pr mote a contest that includes printed educational materials that in tu promote another radio program. This saturation can develop into wh might be called environmental synergy, in which the sum of t messages becomes greater than their parts.

- **Preventive interventions should focus on the community, both planning and in implementation.** Foremost, community involveme opens many doors for reaching people with educational materials. Wi local cooperation, materials can be routed through schools, work site recreation centers, churches, stores, and voluntary organizations. Co munity members also can be recruited as facilitators; for example, hea care professionals can distribute materials and advice during patie visits. In general, as people come to feel that a program is "theirs," th are more likely to participate and to retain beneficial new behaviors.

Special attention may need to be given to critical subpopulatio within a community. For example, in recognition of the disproportio ate burden of violence that minority groups frequently bear, the Cent for Disease Control and Prevention has sought extensive input developing its youth violence intervention guidelines from commun minority leaders and others who already have implemented innovati prevention programs in urban centers. Also, as mentioned earlier, t Stanford program developed special programs for Spanish-speaki community members.

Developing community strength also may prove crucial for the lo term vitality of prevention efforts. The Stanford group, for examp believes that adoption of prevention programs by existing commun organizations—including schools, hospitals, health agencies, and citize groups—is generally necessary to supply ongoing reinforcement a reminders and to provide new knowledge and skills as they beco needed (Farquhar, Fortmann, Flora, Taylor, Haskell, Williams et al., 199 The form this process of "institutionalization" takes may vary consid ably, but one possible model is to develop a council or consortium of lo agencies that deal with health education and prevention programs. T not only will ensure an adequate base of expertise, but also may territorial wrangling and maximize interagency cooperation.

- **Preventive intervention programs should be rigorously design and the programs and their components evaluated extensively.** T

should occur as the program is being developed (formative evaluation), while it is being conducted (process evaluation), and after it has been completed (summative evaluation).

In the Stanford programs, for example, investigators first analyzed the needs of the targeted audience to discover the interests, educational status, media use, and other characteristics of different subsections of the community, which helped determine the proper location and time for educational activities. They also developed prototypes of educational materials and programs and tested them among sample audiences to determine the appropriate content and method of delivery.

When the prevention campaign was under way, investigators carefully monitored the introduction of educational materials into the community to assess what was working and what needed to be revised. This process evaluation identified some of the factors that influenced participation in various aspects of the program, dictated how much was learned, and determined whether an event or program actually affected behavior.

During and after the intervention, investigators collected data on a number of health outcomes. They also evaluated specific risk reduction strategies (e.g., smoking cessation, dietary counseling) to determine their effects on individual knowledge, attitudes, and behavior. For example, the effects of a quit-smoking contest with 500 participants were evaluated through several measures: a mail survey of contest finishers, a telephone survey of selected nonrespondents, a carbon monoxide assessment of contestants who quit, and a one-year follow-up examination of those who tested positive for carbon monoxide—an indicator for smoking (King, Flora, Fortmann, and Taylor, 1987). Data from this study allowed investigators to see both the successes and the shortcomings of the contest. The findings showed that the quit rate for contestants was twice as high as the rate in the general population in the control communities, and the cost of the program—including its evaluation—was lower than that of traditional antismoking classes or groups. Program planners concluded that the contest could be strengthened by extending the program to add a relapse prevention element and by the use of incentives to maintain abstinence.

- **Prevention efforts must increasingly recognize the many areas of overlap between physical health and mental health.** To cite just one example, the causes and consequences of violence are not only physical but psychological. Traumatic brain injuries, frequently caused by gun shots or automobile and motorcycle crashes, induce severe mental disturbances in thousands of persons each year. Even victims of violence who recover from their physical injuries frequently bear long-

lasting psychological scars. Indeed, entire communities can be de
lized by continuing outbreaks or threats of violence, reducing the q
of life and perhaps helping to perpetuate the cycle of violence
integration of physical and mental aspects of health care in preve
will require a broad interdisciplinary approach.

- **Prevention efforts require a significant and sustained cor
ment on the part of the federal, state, and local governments
coordination across disciplines and agencies.** The prevention
grams in physical health are complex and multifaceted, reflectin
nature of the health problems they are designed to address. Simi
mental health interventions typically will be complex and mul
eted. There are likely to be multiple points in the causal chain v
preventive interventions could be applied, which will require
consider a wide range of prevention strategies. Outcomes will ne
be assessed not only in the short term but also in the long
Furthermore, as is true in the physical sciences, multidiscipl
approaches drawing on expertise from numerous scientific doma
ranging from the physical and mental health fields to the
sciences, education, political science, and communications-
prove most fruitful. It is therefore imperative that prevention e
for mental disorders be carefully and systematically coordinate
the federal, state, and local governments across the gamut of age
that will be involved. As the history of prevention progran
smoking and highway safety vividly illustrates, coordination w
the government is crucial to success. While the federal govern
has a critical role in setting priorities and providing suppor
prevention services and research, state and local governments
important public health responsibilities, not only to set and
force relevant laws and regulations, but also to generate their
hypothesis-driven prevention programs whose outcomes can be
assessed.

An equally great challenge will be to muster the national po
will—and corresponding financial support—required to move ex
tiously ahead. Such an investment was necessary in order to
forward in cardiovascular disease, smoking, and injury prevention
cost of prevention programs, based on the experience of some
physical health care models, will not be small (Farquhar et al., 1990)
benefit-cost analyses are imperative as the prevention field n
ahead. However, the cost of *not* beginning to design and imple
mental health intervention programs may be even greater. Give
successes in prevention of physical illness, the energies of citizen
communities can surely be harnessed to prevent mental disorders

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# 4

# The Core Sciences: Contributions and Frontiers

Research on the prevention of mental disorders, like all research, should be grounded in a rigorous scientific tradition. If prevention research can build on past contributions and integrate an immense amount of new knowledge from a wide range of core sciences, it will be able to expand its frontiers and open up new possibilities for intervention. Two broad areas of science provide the knowledge base for research on the prevention of mental disorders—the behavioral sciences, in which the study of mental disorders has its historical roots, and the biological sciences, which have begun to provide insights into these disorders more recently.

The boundaries between the behavioral and biological sciences should not be viewed as rigid and distinct. Interdisciplinary investigations that incorporate principles and findings from both the behavioral and the biological perspectives have vital implications for research on the prevention of mental disorders. The frontiers for the field of prevention can be moved forward through appropriate theoretical integration. In the sections that follow, this chapter presents four of these integrative core sciences as illustrations—neuroscience, genetics, epidemiology, and developmental psychopathology—to highlight how they have contributed and will continue to contribute to preventive intervention research.

## NEUROSCIENCE

Neuroscience research encompasses the acquisition of knowledge about fundamental biological processes of the brain and nervous system

and about the pathophysiology of neurological disease processes, in cluding cellular mechanisms underlying etiology, course, and outcome Knowledge about these biological processes can lead to the design c strategies aimed at treating specific symptoms and disorders and eval uating the efficacy and limitations of those treatments. Such under standing also can be important in framing and implementing a rationa prevention strategy. The more that is known about etiology, the mor possible it becomes to target preventive interventions to intervene i causal chains.

Neuroscience research varies in scope from highly theoretical t practical application, but, in general, the neuroscience research sup ported by the National Institutes of Health (NIH) takes a more disease oriented focus, whereas the research supported by the National Scienc Foundation (NSF) focuses on acquiring basic knowledge about th functioning of the nervous system. The strategic value of having thes complementary approaches is well recognized, but merits reaffirmation knowledge from research in basic science is essential for applie investigations. Using worms or grasshoppers to study how nerve cell grow, differentiate, and reach their targets, and investigating the inter action between genetic and environmental factors in these processes provides a simpler model system for understanding how more comple systems function.

Neuroscience research has provided important insights into how mental disorders arise. The discovery of chemical neurotransmissio more than 70 years ago can be taken as the beginning of the moder neuroscience era. Prior to this discovery, understanding of the brain wa limited to knowledge of its anatomy. Now, however, the functiona relationship between certain classes of transmitters and specific neu rons, the nature of transmitter receptors, and the consequences c receptor activation are being studied. Specific data are being gathere that define conditions in which channels will open or close, calcium wi enter the cell or be excluded, and genes will be activated or silenced.

The basic function of nerve cells is to transmit information. Onc chemical neurotransmitters are released, they act on neighboring cells t excite or inhibit them. There is a highly precise interaction between th neurotransmitter and a specific receptor protein on the target cell tha regulates the latter's response, yet a single neurotransmitter can affe multiple receptors. For example, the neurotransmitter serotonin, whic is important in both depression and schizophrenia, acts on at least 1 different specific serotonin receptors, and the neurotransmitter gamma amino butyric acid (GABA) may act on as many as 100. These receptor differ slightly in their molecular structure and in the target function

they regulate, and are dispersed among cell clusters throughout the brain, thus providing great diversity in the cellular response to a single neurotransmitter. Serotonin released from a group of neurons may excite some neighboring cells and inhibit others, with gradations of activation and inhibition depending on the diversity of receptors it acts upon. There are also differences in where the receptors are found on a given cell, how avidly they respond to the transmitter, how long they respond, and what other cellular processes they regulate.

The production, liberation, and inactivation of neurotransmitters are highly regulated biological processes. Elucidating the mechanisms underlying these processes has contributed to the discovery of drugs used with varying degrees of success to treat schizophrenia, major depressive disorder, bipolar disorder, anxiety disorders, including obsessive compulsive disorder, and other conditions. Recent advances in molecular biology have led to an increase in our understanding of the scope and complexity of neuronal function. The practical outcome so far has been the discovery of new classes of drugs, such as the calcium channel blockers.

One goal of current research is to provide even greater effectiveness of drug therapy by increasing the number of cellular targets for drug action. These may include more receptor-subtype-specific agents, as well as drugs that act on ion channels (that regulate the influx and afflux of charged molecules) and protein kinases (that add phosphate groups to proteins), all of which are steps between the receptor and the cellular response to its activation. The potential implications of this research for indicated preventive interventions may be considerable if the medications are found to be safe enough to justify their use with high-risk individuals who have developed early signs and symptoms of a disorder.

## GENETICS

Research into the genetic causes of disease is among the most active and exciting areas of biomedical investigation.* Within the next several years, genetic research promises to make substantial contributions to our understanding of mental disorders.

Genetic influences are quite relevant to prevention research. First, the accumulated results in genetic research have provided convincing evidence of the role of genetic factors both in normal variations in

*Portions of this section were based on a commissioned paper by M. Rutter, available as indicated in Appendix D.

psychological functioning and in psychopathology (Loehlin, 1992; min, 1990, 1986; Rutter, Bolton, Harrington, Le Couteur, Macdo and Simonoff, 1990; Rutter, Macdonald, Le Couteur, Harrington, ton, and Bailey, 1990; Vandenberg, Singer, and Pauls, 1986). Herita estimates for most mental disorders tend to be in the 30 to 60 pe range, so the genetic component, although not overwhelming, is b means trivial. Second, interaction between environmental influe and genetic factors will be clearer as research gradually elucidate specific impact of genes on mental functioning. Genetic studies hav power to be highly informative about developmental processes psychopathological mechanisms (Rutter, Simonoff, and Silberg press; Rutter, Silberg, and Simonoff, 1993; Rutter, 1991). Becaus understanding of such processes and mechanisms is crucial for the effective planning of interventive measures, genetic research an netic knowledge are potentially very valuable to prevention as we treatment. Current and potential contributions to prevention cent the following topics:

- Nature of disorders. When planning preventive interventi knowledge about the nature of the disorders to be prevented may be helpful; genetic research findings can be useful in that connec First, they may point to basic causal processes. Second, they can ind which disorders are, and which are not, continuous with norm distributed characteristics. Third, disorders may come about thr several rather different mechanisms, and genetics research ma helpful in determining which mechanism applies in each case.

In the future, research will seek to understand whether dis specific genetic alleles controlling receptor-mediated processes lea mental disorders. If this is found to be true, the initial application o knowledge will be to screen individuals bearing the disease-sp allele so that earlier, and hopefully more effective, preventive strat can be implemented. Some of these indicated preventive interven may be pharmacological, but rich opportunities also exist for psych cial interventions.

An example of such an opportunity may exist with infantile autis severe developmental disorder that strikes in infancy and lead profound cognitive and social impairment. Autism represents a di bance in the development of the brain centers that mediate lang and information processing. One goal of research in autism is to ide a reliable marker for the disorder that will enable high-risk individua be identified in early infancy. Indicated prevention strategies, su language and social skills training, could then be implemented to

advantage of the great plasticity of the brain in early childhood. One hypothesis of this research is that immature, still developing brain centers could be stimulated to acquire the function of the centers that are developmentally impaired, thus delaying or even eliminating the emergence of autism. This notion arises directly from the concept of sensitive periods, that is, periods in development during which relevant stimuli and transactions must occur or development is irreversibly altered, an important principle derived from basic research in developmental neurobiology.

- Mechanisms of genetic risk. In the past, much genetic research in the field of psychopathology has been concerned with quantifying the genetic contribution to overall population variance. In themselves, however, heritability estimates are not particularly useful because they carry no information about the mechanisms involved in genetic risk. Understanding genetic mechanisms is crucial for most effective interventions. Phenylketonuria constitutes an obvious example of a disorder in which such an understanding has led to an extremely effective environmental preventive intervention (low phenylalanine diet in childhood). Thus a disorder that is genetic nevertheless leads to disabilities that are environmentally preventable.

There is a rapidly growing body of evidence that major genes play a contributory role, as part of multifactorial inheritance, in a range of complex human diseases, including diabetes, heart disease, and hypertension (Weatherall, 1992). The value of these studies is that they are beginning to identify the mode of operation of genetic risk (Kurtz, 1992). Cambien and colleagues have reported that a deletion polymorphism in the gene encoding the angiotensin converting enzyme (ACE) may be a risk factor for myocardial infarction in a specific subgroup of individuals (Cambien, Poirer, Lecerf, Evans, Cambou, Arveiler et al., 1992). If confirmed, this particular finding could mean that genotyping could be used to identify people for whom administration of an ACE inhibitor might prevent recurrent myocardial infarction. The implication of this work, particularly for mental disorders, is that for most conditions we must move from thinking about a single cause of a disease (genetic or environmental) to thinking about how we may elucidate possible risk mechanisms. Examples relevant to mental disorders include the role genetic factors play in alcohol dependence, depressive disorders, physiological reactivity, temperamental characteristics, and emotional and conduct disturbances.

- Testing for environmental effects. Traditionally, studies examining differences between identical and fraternal twins have been classified as genetic research. However, when the phenotype being studied is a

behavior, these studies provide the most satisfactory way of quanti
the strength of environmental effects. Other types of studies that
provided useful information include adoption studies; studies of va
classes of relatives, using path models; and experimental stu
including experiments of nature, in which individuals are expose
changing environments.

As Plomin and Bergman (1991) pointed out, the fact that a variab
labeled as "environmental" does not mean that its effects are envi
mentally mediated; many supposedly "environmental" measures a
ally index genetic, as well as environmental, influences. This poi
best seen with the many risk factors that are based on someo
personal characteristics or behavior, such as low intelligence, agg
siveness, and behavioral inhibition. These involve a genetic compon
as well, and it is necessary to determine whether the psychiatric
reflects genetic or environmental mediation.

- Individual differences in environmental effects. One of the m
important recent findings from behavioral genetics research with tw
has been the demonstration that, for many aspects of normal a
abnormal psychosocial development, nonshared environmental effe
tend to be substantially more important than shared ones in quantifyi
variability in outcomes (Plomin and Daniels, 1987). Shared risk facto
that apply to the family as a whole, such as family discord or poverl
are indeed relevant, but they are likely to impinge on different childr
in the same family to varying degrees or in different ways, that is,
have nonshared effects. If we are to understand how such environme
tal risk factors operate, we must investigate the processes on a perso
specific basis and not simply assume a uniform impact.

Relative differences between siblings in how they are treated in
home may be more important than the absolute level of this treatment i
the home (Dunn and Plomin, 1990). That is, what appears to be a share
risk factor within the family may actually be an unshared risk factor
with its concomitant unshared effect, for, perhaps, only one child in th
family. For example, it may be that it is less important whether parent
respond to their children in a generally warm, or strict, or harsh fashio
than whether one child in the family is consistently dealt with less
warmly, or more strictly, or more harshly than his or her brothers and
sisters. In other words, scapegoating or favoritism may be the operative
risk factor (Boer and Dunn, 1992).

Attention needs to be paid to shared and unshared risk and protective
factors and shared and unshared effects outside, as well as inside, the
family. The body of evidence that school influences have effects on
children's behavior and scholastic attainments (Maughan, in press;

Mortimore, in press) is particularly pertinent because it provides a setting for potential prevention that applies to all children. Peer group and community influences are also relevant (Quinton, in press; Reiss, in press).

- Individual differences in exposure to risk factors. During the last decade, behavioral geneticists have drawn attention to the various ways in which gene-environment interactions can arise. They have argued that, to a great extent, individuals shape and select their environments and that genetic factors play a part in this process (Scarr, 1992; Scarr and McCartney, 1983). Many nongeneticists have been reluctant to accept this possibility and have interpreted the suggestion as an argument against taking measures to improve environmental conditions. This suggests a point that may be vital to planning effective interventions, namely, that individuals vary greatly in their exposure to risk factors in their environments (Rutter and Rutter, 1993). Psychosocial stresses and adversities are not randomly distributed, and it is essential that we understand how those individual differences in risk exposure come about. This issue has not been addressed in any intensive and systematic manner, but we need to learn why some individuals suffer a host of environmental adversities, whereas others go through life with a string of generally positive experiences. Individual differences in environmental risk exposure should be treated as dependent, as well as independent, variables.
- Misleading environmental assumptions. Up until 10 or 20 years ago, there was a widespread assumption that birth trauma was an important environmental cause of brain damage and therefore a common cause of mental retardation and cerebral palsy (Hardy, 1965). More recent findings have forced a reassessment of this belief and now indicate that in most cases the causal factors operated at a much earlier stage in gestation (Nelson and Ellenberg, 1986). Nevertheless, there is still a tendency to treat obstetric complications as though they were only environmental risk factors. Recent evidence suggests that the process may also work the other way around: genetic or chromosomal abnormalities in the fetus may predispose to obstetric complications. For example, studies in children with Down's syndrome have indicated that the genetic abnormality is associated with a substantially increased risk of obstetric complications (Bolton and Holland, in press). This appreciation has also led to a reevaluation of the etiological role of obstetric complications in autism.
- Genetic counseling. Most medical genetic counseling has been based on the various patterns of risk associated with different types of genetic disorders: autosomal dominant, autosomal recessive, and so

forth. But advances in molecular genetics now enable us to p individualized risk information and not just actuarial probab Genetic counseling is no longer confined to advising people abo risks involved if they have children or the risk involved in a part pregnancy. It may now involve decisions on whether to take preve action with people who are known to be at genetic risk thr mechanisms involving susceptibility to environmental factors.

- Gene therapy. Gene therapy may become a possibility with applications in the field of mental disorders. Some therapy is curr feasible in conditions caused by a single gene of major effect. mental disorders, however, involve multiple genes. It is now possib tissue culture cells, and in limited cases in animals, to modify expression of mutant genes and alter their pathologic outcome. capability will only grow over the coming years, and the advent of therapy has led to a parallel realization of the ethical dilemma engenders. There is now growing agreement that somatic gene the to treat a disease, in which the genes of body (e.g., muscle) cells modified, is ethical in certain circumstances. In contrast, there currently an active debate over whether modification of genes in germline cells (sperm and ova) can be considered ethical in circumstances.

## EPIDEMIOLOGY

Epidemiology also can take a developmental and integrative persp tive on the etiology and course of psychopathology. Epidemiology is t study of the distribution of disorders in populations. Epidemiologi prefer to study well-defined populations, including community sa ples. The differential distribution of disorders is reported as inciden and prevalence of specified disorders. *Incidence* refers to the rate which new cases of the disorder arise. *Prevalence* is the proportion of t population with the disorder. The prevalence of a disorder is a functio not only of incidence but also of duration. Disorders can vary duration from brief to lifelong. *Point prevalence* is the proportion in th population at a given point in time who have the disorder. Poi prevalence is most useful for estimating need for services. *Lifetim prevalence* (sometimes called the proportion of survivors affected, PSA) is the proportion of the population who, at some time during the lives up to the present, have had the disorder. Lifetime prevalence i most useful to those with interest in genetics. But because not everyon surveyed will have lived through the age of risk at the time of the interview, lifetime prevalence estimates are considered conservative.

Preventive interventions are directed toward reducing incidence, whereas treatment interventions seek to reduce prevalence by early detection and reduction of duration by effective intervention to reverse the symptoms and reduce the likelihood of relapse. Without effective treatment interventions, early case identification will have the paradoxical effect of increasing prevalence by increasing the count of a disorder that will then have lengthy duration because it is untreatable.

Epidemiological research has produced data on differential incidence and prevalence by demographic factors such as age, gender, educational level, employment status, ethnicity, and socioeconomic level; environmental factors such as hazardous conditions, toxic substances, stressful environments, availability of resources or supports, and ease of availability of drugs, alcohol, guns, and cars; personal attributes such as temperament, attractiveness, intelligence, and prior individual experience; and biological attributes such as genetics, health status, and other biological vulnerability.

Throughout epidemiological research, there is a common goal of identifying risk factors. There are two major research strategies for ascertaining the relation of risk factors to subsequent disorders. They are the *case-control* and the *cohort* designs. Case-control studies are often an initial and exploratory step in the identification of risk. An observed condition or disorder within an individual is called a "case." The cases are then compared with "controls," that is, similar individuals who do not have the disorder. On the basis of existing knowledge and reasonable hypotheses about antecedents, the cases and controls are compared retrospectively across a number of salient dimensions. This approach is often followed by a prospective cohort study, in which a group of persons who all have the antecedents of interest (that is, the risk factors) but do not have the condition or disorder of interest are compared with a group of persons who have neither the antecedents nor the disorder. These cohort studies yield actual estimates of the risk of disorder that follows a particular event or set of events.

Epidemiological studies of the occurrence of differential distribution of disorders across the population have yielded valuable data on both the origins and the life course of mental disorders. In studying the origins of a mental disorder, a prospective longitudinal design is particularly powerful. Epidemiological research designs that sample a range of populations and use repeated measurements permit inferences about causality. For some rare disorders and for disorders with onset in later life, case-control studies are the only practical method.

Two refinements of the concept of risk allow comparisons of various factors as they influence the development of disorder. One important

refinement is *relative risk*. Relative risk is the ratio of incidence for a g disorder in an exposed population to the incidence in an unexp population. For example, the risk of death by lung cancer might b times higher among smokers than among nonsmokers—a relative ri 15. Relative risk is obtained in a cohort study and can be approxim in a case-control study.

A second measure linked to risk is *attributable risk*. Attributable risk is maximum proportion of cases that would be prevented if an interven were 100 percent effective in eliminating the risk factor. Attributable combines information on relative risk with information on the prevale of the exposure, in order to help judge which risk factor to target in try to eliminate the disorder. The formula is $p(r-1)/[p(r-1)+1]$, where prevalence of exposure and $r$ is relative risk (Mausner and Kramer, 19 If the relative risk of lung cancer for smokers versus nonsmokers is 15 above, and the prevalence of smoking is about 50 percent, then proportion of cases of lung cancer attributable to smoking, that is, attributable risk, is approximately 88 percent.

Data on prevalence and on attributable risk are especially germane research on the prevention of mental disorders. To acquire these da diverse strategies of research are needed. The prevalence of the disorc is required in order to assess its impact on the population. Prevalence obtained efficiently from a cross-sectional survey. The attributable ri for a range of risk factors is required in order to select interventions th will have the most powerful effect. Attributable risk probably is mo efficiently obtained via the case-control strategy.

An even more recent frontier is the conceptualization of the age of ons for specific disorders. Determination of age of onset is required in order time the intervention appropriately, that is, before the first incidence of disorder or problem. Decisions as to when to target a high-risk populatio can be guided by epidemiological data regarding the range and mean ag of onset in a population. Age of onset is best obtained from a longitudina study of a cohort from the general population. Recognizing the impor tance of such data, the committee commissioned new analyses of dat from the Epidemiologic Catchment Area study. The conceptualization and methods used in these analyses, and the resulting fresh perspective they permit, are presented in Chapter 5.

## DEVELOPMENTAL PSYCHOPATHOLOGY

Many scientific areas of study with links to prevention research have their origin in the behavioral and social sciences. Developmental psychopathology is one of these areas. (See Box 4.1 for other illustrations.)

## Illustrations from the Behavioral and Social Sciences

Many theoretical concepts originating in the behavioral sciences have relevance to research on prevention of mental disorders. These include self-esteem, regulation of emotions, attribution, cultural and gender-based diversity, social networks, community context, and ecological perspectives. Other concepts are presented here as illustrations of specific areas of study that have had—and will continue to have—an impact on the conceptual design of prevention studies.

*Psychological stress* is associated with a variety of negative effects on health, although the specific mechanisms for this relationship are not well understood. Recent research in psychoneuroimmunology (Ader, Felten, and Cohen, 1991) has suggested that stress can directly affect interactions between he central nervous system and the immune system. Studies of the neuroendocrine correlates of stress, for example, may lead to a better understanding of the physiological pathways by which environmental stressors affect personal health (IOM, 1989, 1984, 1982b; CBASSE, 1988).

*Social support mechanisms* appear to perform an essential function in several areas, including increasing or decreasing an individual's sensitivity to certain stressors, increasing or decreasing an individual's likelihood of using or abstaining from drugs, and increasing compliance with therapeutic regimes. The quantity and quality of social support networks are also thought to have a role in the onset and course of mental disorders, including depression and chizophrenia. One line of inquiry has examined how perceptions of personal control mediate the effects of social networks on health outcomes, a factor that appears to be far more significant than has been recognized by health care providers (CBASSE, 1988; IOM, 1984, 1982a).

*Analysis of the usage of health care delivery systems* is also relevant to prevention. Research on the role of health maintenance organizations (HMOs), for example, has indicated that certain forms of public and private ubsidies of diagnostic and preventive health care practices affect the use of such services by individuals and groups. Data from these studies strongly suggest that the delivery of health care services for the general population could be greatly improved by subsidizing expanded preventive interventions for people at risk for certain health disorders, although the economic and social consequences of such targeted practices have yet to be determined (CBASSE, 1988).

*Interpersonal transaction research* in recent years has defined a complex interplay among expectancies, self-concepts, and motives. For example, hostile acts are often stimulated and guided by expectations of aggression that may be influenced by early childhood experiences. If the individual has experienced aggressive behavior in the past, his or her perceptions may be negatively distorted, rather than assuming ambiguous acts to be benign or accidental (CBASSE, 1993, 1988; Dodge, Bates, and Pettit, 1990).

*Attachment theory* postulates that early relationships between infants and their caregivers, usually their mothers, have a critical role in the infants' later development, especially in social relationships. Infants show attachment behavior by seeking comfort and protection, and caregivers' responses dem-

onstrate the quality of their sensitivity and responsivity. Mother-child
differ in their interactive styles, and there has been considerable researc
the last 15 years, based on early work by Ainsworth and colleagues on
measurement and classification of these differences and their links to
behaviors (Ainsworth, Blehar, Waters, and Well, 1978). This theory has d
relevance to prevention and indeed has been applied in programs designe
enhance healthy parent-infant relationships. For example, a preventive i
vention designed by Erickson, Korfmacher, and Egeland (1992) targ
prospective mothers in "a special window of opportunity" around the bir
their first child with the aim of having an impact on the mother's vie
herself and her child as well as their relationship.

*Self-efficacy theory* is based on the premise that individuals who ha
sense of control over their environment will live a more active and
determined life. Perceived self-efficacy appears to be highly correlated w
wide range of health behaviors, affecting the onset, course, and sequela
both mental and physical disorders (Schwarzer, 1992). For example, perce
self-efficacy is related to the appraisal and management of stressful ex
ences, to the onset of depressive symptoms, to problem-solving strategies
might influence decisions regarding use of cigarettes, to the alleviatio
inappropriate fears of individuals recovering from heart attacks, and to
self-management capabilities of patients with chronic illnesses. A sens
self-efficacy is enhanced as individuals learn how to influence the risk fa
and stressful experiences in their lives by setting attainable goals, enli
incentives and social supports to sustain their efforts for behavior changes,
developing self-regulatory capabilities required for sustaining the new be
ior over an extended period (Bandura, 1992).

Its developmental life span perspective reflects the impact of bio
and psychological changes in the individual, and it provid
opportunity for an integrated empirical application of advances i
core sciences, including neuroscience, genetics, and epidemiol
1984, developmental psychopathology was defined by Srou
Rutter as "the study of the origins and course of individual patt
behavioral maladaptation" (Sroufe and Rutter, 1984, p. 18). Ho
developmental psychopathologists are as interested in individua
do not develop disorders despite severe adversity as in those w
succumb to illness. They also study children who appear emot
healthy early in life, but develop mental disorders in adul
Prospective longitudinal risk research is at the heart of thi
discipline; prospective designs help define etiologies and pathw
illness, illuminating changes in risk and protective factors for in
als over time. The task is complex. "Links between earlier ada
and later pathology generally will not be simple or direct. It
necessary to understand both individual patterns of adaptatio

respect to salient issues of a given developmental period and the transaction between prior adaptation, maturational change, and subsequent environmental challenges" (Sroufe and Rutter, 1984, p. 17). Such a perspective provides a comfortable home for true integration of biological and behavioral influences.

Developmental psychopathology may indeed be the core integrative discipline for the knowledge base for preventive intervention research. Certainly its concepts, principles, and goals are similar to those in prevention. These concepts include risk and protective factors, precursors, sequelae, competence/incompetence, developmental antecedents of disorders, age-defined adaptation, resilience, and predictability. Sroufe and Rutter (1984) believed not only that the information gained from longitudinal risk research could yield valuable information for preventive interventions, but also that prevention was one of the central justifications for the existence of this special discipline. Developmentally based preventive interventions, moreover, have the potential to serve as tests of theory (Cicchetti and Toth, 1992).

Two examples highlight the research developments in developmental psychopathology. First, low birthweight and premature birth have long been thought to be risk factors associated with increased rates of behavioral and emotional symptoms. Early reports of these associations were largely retrospective and descriptive in nature, but with prospective longitudinal studies in many different disciplines the evidence is more sound. For example, Rose and colleagues reported that very low birthweight premature infants manifested more behavior problems than full-term infants at three and six years (Rose, Feldman, Rose, Wallace, and McCarton, 1992). Also, the overall prevalence of clinically significant problems in the low-birthweight premature infants increased with age: at age three, 30 percent had problems; by age six, 50 percent of them did. Studies such as this one add credence to the beliefs that some such infants are at risk not only for cognitive impairment but also for behavioral dysfunction and that the problems are not transient in nature. Other studies, however, have not shown such pessimistic outcomes, thereby raising research questions regarding degrees of risk and the role of protective factors.

Second, developmental approaches to depression—including epidemiology, risk and protective factors, precursor symptoms, onset, course, and sequelae—are needed across the life span. For example, during the transition to parenthood, depression can be a serious problem; about 10 percent of postpartum women develop a depressive disorder severe enough that it interferes with daily functioning (Campbell and Cohn, 1991; O'Hara, Zekoski, Phillips, and Wright, 1990).

Campbell and colleagues found that even though most postpartum depressions tend to be brief, they can last as long as two years; even those women whose depressive episode abates are likely to continue to experience more subtle difficulties (Campbell, Cohn, Flanagan, Popper, and Meyers, 1992). These problems eventually are reflected in the mother-infant relationship. In Campbell's study the infants of depressed mothers received less appropriate and less responsive care and more negative and rejecting care than the comparison group at two months. The impact of maternal depression on the infant's development can be seen quite early. Field (1992) found that these infants can develop a "depressed mood style" as early as three months and that this mood state persists over the first year of life if the mother's depression persists. By the end of the first year, this mood has affected both physical growth and scores on the Bayley Scales of Infant Development. There is also some evidence that by 11 to 17 months of age, infants of depressed mothers exhibit reduced activity in the right frontal area of the brain (Dawson, Klinger, Panagiotides, Spieker, and Frey, 1992). This finding raises the possibility that maternal behavior can influence not only an infant's developing psychosocial areas of functioning but also the development of the central nervous system.

Maternal depression is not the only, and perhaps not even the most frequent, risk factor for the development of depression during childhood. For example, other forms of parental psychopathology and child maltreatment, and especially the interactive effects when both risk factors are present, also significantly increase the likelihood that a child will become depressed in middle childhood (Downey and Walker, 1992; Toth, Manly, and Cicchetti, 1992).

The rate of depression rises overall between childhood and adolescence. In a sample of 3,519 8- to 16-year-old psychiatric patients, both boys and girls had increasing rates of depression across this age range, with no gender difference in rates before age 11 (Angold and Rutter, 1992). However, by age 16 girls were twice as likely as boys to have significant depressive symptomatology. When age was controlled for, pubertal status had no effect on depression scores. Depressed girls are at high risk for multiple problems, including early pregnancy. The babies of these girls can be, in turn, at risk for developing a similar affective style.

These two examples—low-birthweight premature births and depression—highlight new directions and frontiers for research in developmental psychopathology. First, there is value in understanding age variations in susceptibility to a wide range of phenomena, including low birthweight, parental psychopathology, brain injury, attachment prob-

lems, and hospital admissions. Second, it is essential to learn about continuities and discontinuities in development and about normal variation so that researchers can begin to clarify when preventive interventions are not warranted as well as when they are. Third, there is much more to understand about indirect causal chain processes, mechanisms, and biological and environmental interactions. Finally, there is a need to assess risk factors and the effects of intervention across multiple age periods in each individual and across generations, such as both mothers and their infants.

## FINDINGS AND LEADS

- There is an increasing tendency within the biological and behavioral sciences to appreciate the complexity and interplay of genetic and environmental interactions. There has been some movement away from the traditional nature-nurture dichotomy toward a recognition that genetic inheritance (the genotype) provides a reaction range within which the environment can have some impact on the characteristic that is expressed (the phenotype).
- An understanding of etiology can contribute to the conceptualization and implementation of rational preventive interventions. Research in the core sciences to uncover the wide range of biopsychosocial etiological factors in mental illness is therefore critical to the long-term success of the prevention research initiative. Such basic scientific research endeavors have been the building blocks for the knowledge base on which prevention research has developed.
- Many of the interdisciplinary areas of investigation with relevance to prevention research have independently recognized the utility of a developmental focus. These areas include neuroscience, genetics, epidemiology, and developmental psychopathology. From this developmental focus has arisen the concept of sensitive periods.
- Eventually, it may become possible to determine the precise mechanisms by which environmental risk factors operate. In attempting to ascertain the relative contributions of the biological and environmental influences on expressed behavior or attributes, a number of paradigms have been useful, including twin, adoption, and experimental studies. In the absence of sound knowledge on risk mechanisms, there is some danger that prevention measures may be either wrongly targeted or so diffuse that they do not bring the expected benefits.
- There is considerable evidence that people act in ways that influence the level of risk in the environments they experience. What is less certain is the genetic influence in this process. Genetic influences on behavior

may heighten or lower the likelihood of risk exposure. Investigations into genetic influences should lead to increased understanding as to how individual differences in environmental risk exposure come about.

- In the field of genetics, research findings are accumulating rapidly. Some of these are relevant to traditional genetic disorders that have psychiatric implications (e.g., mental retardations, Huntington's disease), but many have considerable value for the broader range of common, multifactorial mental disorders in which genetic factors play a variably prominent role, such as alcohol dependence and depressive disorder. To a limited extent, available genetic data have preventive implications in the area of genetic counseling, but, to a much greater extent, the findings identify the potential importance of environmental preventive interventions for individuals who are known to be at genetic risk through mechanisms involving vulnerability to environmental factors.
- Effective and efficient research on prevention of mental disorders requires that certain data on the epidemiology of the disorders be available—specifically, incidence, prevalence, relative risk, attributable risk, and age of onset. Such data are needed across the life span for an integrative, developmental understanding of mental disorders.
- Research studies on risk factors in the interdisciplinary area of developmental psychopathology have the potential for developing into preventive interventions targeting these risk factors with developmentally appropriate timing.
- Much can be learned from studies of individuals who do not develop mental disorders despite being at high risk as well as studies of individuals who appear emotionally healthy while young but develop mental disorders in adulthood.
- Contributions from areas of investigation rooted in the behavioral sciences offer substantial leads for research on the prevention of mental disorders. These include the impact of psychological stress on health; the role of social support mechanisms in decreasing risk factors and enhancing protective factors; usage of health care delivery systems; the relationship between theoretical concepts such as attachment, self-esteem, and self-efficacy and later social relationships and health behaviors; and the importance of social frames of reference, including race, culture, gender, and community context.

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# 5

# Description of Five Illustrative Mental Disorders

The diagnosis of mental disorders is made on the basis of signs
symptoms of aberrant thoughts, words, and behaviors. As
there are no laboratory tests to diagnose these illnesses. Cli
arch continues to refine our understanding of the symptomatol
ural course, co-morbidity, and treatment effectiveness for me
rders. Continuing research on epidemiology provides needed
ncidence, prevalence, prodromal periods, and age of onset. In
pter, the discussion of this knowledge is organized around
or mental disorders: conduct disorder, depressive disorders, alc
se and dependence, schizophrenia, and Alzheimer's disease
ter 6, the same disorders are examined for risk and prote
ors that may eventually offer targets for intervention.
hese five disorders were chosen as illustrations—for use in
pter as well as in the rest of the report—because they are all ser

disorders may also be appropriate for the introdu
research strategies. These five disorders are simpl
range of factors and approaches that must be consi
preventive intervention research programs. The bri
sented here, each highlighting slightly different poi
how the information that is available for a particular
reviewed. The disorders are presented here in devel
to emphasize the importance of a life course perspe

## DATA SOURCES, CONCEPTS, AND METHODOLO
## DISORDER DESCRIPTIONS

### Epidemiologic Catchment Area St

The prevalence data for the five disorders are fr
including the National Institute of Mental Health's E
ment Area (ECA) study, which has been discusse
other reports (various chapters of Robins and Re
below). Data on age of onset during the adult years
prospective one-year follow-up ECA study, design
mate the incidence of specific mental disorders (Ea
and Taube, 1981). The onset data are not widely avai
so are highlighted here, along with their new applic
of prodromes, as well as explanations of the spe
concepts in preventive intervention research.

The ECA study consisted of community surveys
university-based research teams in different locati
States. The data presented below are from four site
land (Johns Hopkins University); St. Louis, Mis
University); Durham, North Carolina (Duke Univers
les, California (University of California). At each of t
prevalence survey and the one-year follow-up were

conducted with about 80 percent of those interviewed at
The DIS portion of the interview consisted of specified qu
pertinent to diagnostic criteria from the third edition of
*and Statistical Manual* (DSM-III) of the American Psychiat
The revised DSM-III-R is the best classification system a
current time (DSM-IV is in press) and is the basis for the d
throughout the rest of this report. However, operationa
specific mental disorders as given in DSM-III, when m
criteria changes were made, were used in the ECA stud
for determining onset in the analyses below. Onset is c
the first diagnosis of the disorder. Diagnoses were mad
symptom data by means of computer algorithms that
application of DSM-III criteria (Boyd, Burke, Gruenberg
George et al., 1984). Because the ECA results depende
diagnostic criteria chosen and the method of ascertainme
disorders as classified therein are referred to here as
disorders."

## Conceptualization of Onset

The absence of firm data on the validity of the DSM
classifying mental disorders enjoins us to be careful abo
izing the process of disease onset. It is particularly diffic
the validity of a threshold for the presence versus t
disorder, because signs and symptoms of mental disor
spread in the population and do not always reflect the
mental disorder. From the clinical standpoint, subtle diff
behaviors are categorized may suggest quite varied
making diagnoses; from the epidemiological standpoint
ences in threshold may produce widely varying prevale

A disorder that has a complex causal chain, where no p

development, such as infancy, adolescence, or old a
should be planned before or during sensitive period
the sensitive periods of the risk factors are not well
must occur before onset.

The *first incidence* of a disorder is the first onset of t
lifetime of the individual. It is usually simply called *inc*
to age of onset in a population. The numerator for t
composed of those individuals who have had an onse
in their lives, and the denominator includes only pers
period of study with no history of the disorder. The in
best quantitative expression of the force of morbidity
at a given age. Onset of first episode is a key conce
because it is assumed that the causal structure pro
changes after that point; that is, the risk factors that in
a disorder may not be the same as the risk factors
exacerbate the disorder once it has occurred. Incider
from *attack rate* (also sometimes referred to as incide
those studying acute diseases such as respiratory inf
the rate at which episodes of disorder develop in
currently in an episode. The denominator for the atta
from that for first incidence in that it may include pers
an episode of disorder earlier in their lives, but who
meet the criteria for disorder; that is, it includes remi

For mental disorders and for many physical disor
morbidity may be expressed by the rate at which in
variety of thresholds, including onset, in the process
a disorder. These thresholds may be below the c
criteria or above them. The causal structure is not w
either initiation, prolongation, or exacerbation. Ther
value of incidence versus attack rate is an empirical qu
yet been resolved.

The *prodrome* is e period prior to onset of a disc

diagnostic cluster that precede disorder, but do not predi
disorder with certainty, are referred to here as *precu*
*symptoms*. Signs and symptoms from a diagnostic cluster th
the development of a disorder in a particular individual a
as *prodromal signs and symptoms*. At the present state of our
the onset of mental disorders, there are few or no signs a
that predict onset with certainty. Nevertheless, precur
symptoms can be helpful in identifying groups at much h
onset than the general population.

## Methods for Analyzing Onset

An important problem in presenting data on age of ons
(Lawless, 1982). In the context of age of onset, censoring
the exact age of onset is known for only a portion of the s
remainder, the age is known only to exceed some giv
censoring) or to be below some given age (left cen
presentations on age of onset arise from cross-sectional
right censored (e.g., Christie, Burke, Regier, Rae, Boyd
1988). In field surveys, the cross-sectional method is used
the presence or absence of disorder over the history of
through retrospective recall, and then to determine age
those with a positive history. In such surveys the va
individuals do not report a history of disorder, and
individuals without disorder will develop a disorder after
completed. Therefore the right-censored data from such
inevitably biased in the direction of earlier age of onset.
bias is difficult to know without knowledge of the age of on
be sizable. For example, imagine ascertaining age of onset
that typically has a very late onset, such as Hunting
through a cross-sectional survey of the general populati

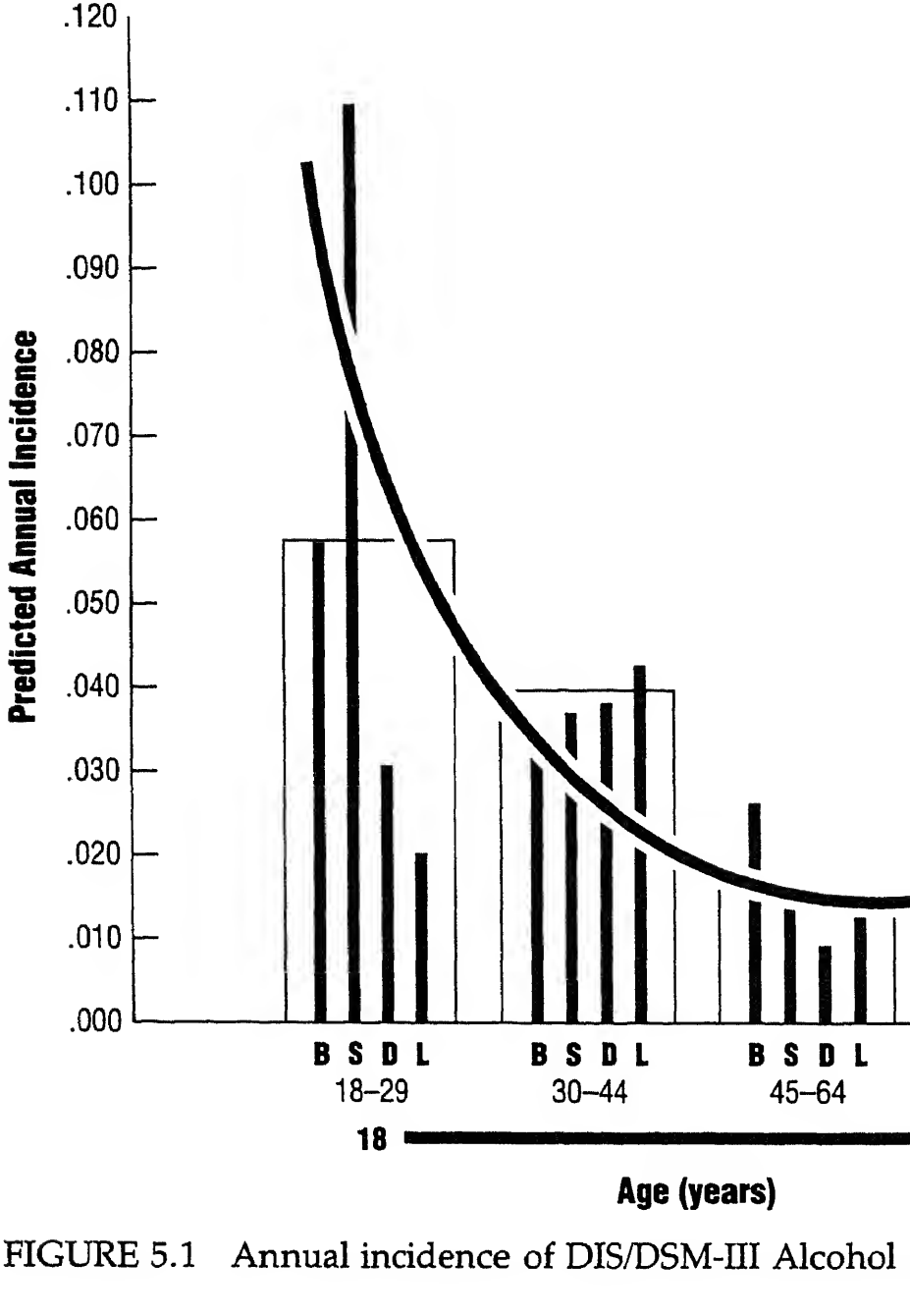
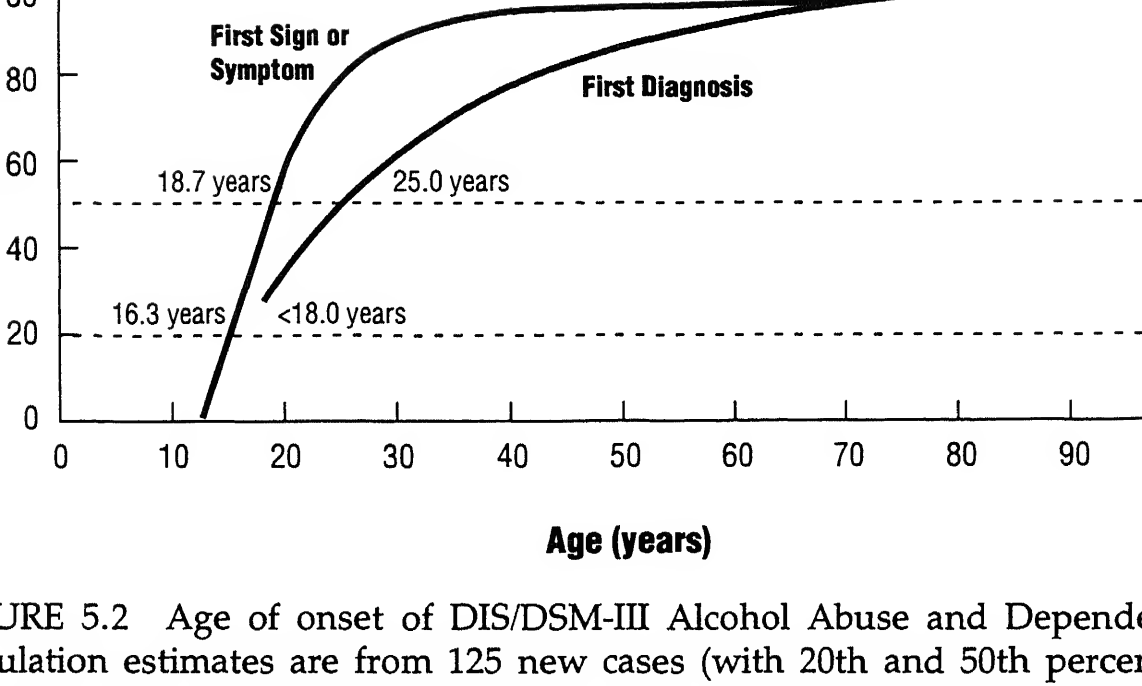



FIGURE 5.1 Annual incidence of DIS/DSM-III Alcohol

of morbidity to the life course, which may have eti
For example, F gure 5.1 presents data on the incid




URE 5.2 Age of onset of DIS/DSM-III Alcohol Abuse and Depend
ulation estimates are from 125 new cases (with 20th and 50th percer
ked). Source: NIMH Epidemiologic Catchment Area Study, Four Sites,
983.

he occurrence of a handful of new cases among many thousan
sons at risk for developing the disorder over the one-year follow
volatility is best demonstrated by the thin black bars, w
resent age-specific rates at each site. The open rectangle is
-specific rate for all four sites collapsed, and it shows more stab
to pooling of data. The curve itself involves the maximal smoot
ne data, using only two degrees of freedom. The cumulative for
sentation obscures this statistical volatility. The cumulative distr
s presented for the five disorders below are weighted statistical
resent a population with age, gender, and race characteristics i
l to those of the U.S. population (as in Robins and Regier, 199
he cumulative form of presentation, along with the statistical we

A variety of malleable risk factors may be availab
any given disorder. Intervention should start as ea
other things being equal. But in many situations, a
life may still be effective, even if some will alread
Combining the cumulative distributions with the
with cost and outcome factors can aid policymaker
on priorities in the use of resources.

Figures 5.2 through 5.5 present two cumulativ
The distribution on the right focuses on the age at
first meets full criteria for the given DIS/DSM-II
distribution, onset must occur during the one-year
follow-up. The population being studied include
never met criteria for diagnosis at the beginning of
It includes those with no symptoms, as well
symptoms of disorder, but not meeting full D
distribution on the left focuses on the age at which
symptom related to that disorder first occurred,
individuals who had developed the disorder by the
period. Dotted lines mark the twentieth and fiftieth
values for these are recorded on the figure. The a
curves gives a rough outline of the prodromal per

In the text and figures below, data are presented
and prodromal periods in individuals who have e
of disorder.* During these prodromal periods,
symptoms were present, and ideally these individ
identified as being at high risk. The data were, ho
problems of retrospective recall by individuals w
disorder.

## ILLUSTRATIVE DISORDERS

## BLE 5.1 DSM-III-R Diagnostic Criteria for Conduct Disorder

A disturbance of conduct lasting at least six months, during which at least thr the following have been present:

(1) has stolen without confrontation of a victim on more than one occasion (including forgery)
(2) has run away from home overnight at least twice while living in parenta parental surrogate home (or once without returning)
(3) often lies (other than to avoid physical or sexual abuse)
(4) has deliberately engaged in fire-setting
(5) is often truant from school (for older person, absent from work)
(6) has broken into someone else's house, building, or car
(7) has deliberately destroyed others' property (other than by fire-setting)
(8) has been physically cruel to animals
(9) has forced someone into sexual activity with him or her
(10) has used a weapon in more than one fight
(11) often initiates physical fights
(12) has stolen with confrontation of a victim (e.g., mugging, purse-snatchin extortion, armed robbery)
(13) has been physically cruel to people

**Note:** The above items are listed in descending order of discriminating power based on data from a national field trial of the DSM-III-R criteria for Disruptive Behavior Disorders.

If 18 or older, does not meet criteria for Antisocial Personality Disorder.

**eria for severity of Conduct Disorder:**

**l:** Few if any conduct problems in excess of those required to make the diagno conduct problems cause only minor harm to others.

**erate:** Number of conduct problems and effect on others intermediate between d" and "severe."

**re:** Many conduct problems in excess of those required to make the diagnosis, luct problems cause considerable harm to others, e.g., serious physical injury t ns, extensive vandalism or theft, prolonged absence from home.

CE: American Psychiatric Association, 1987, p. 55.

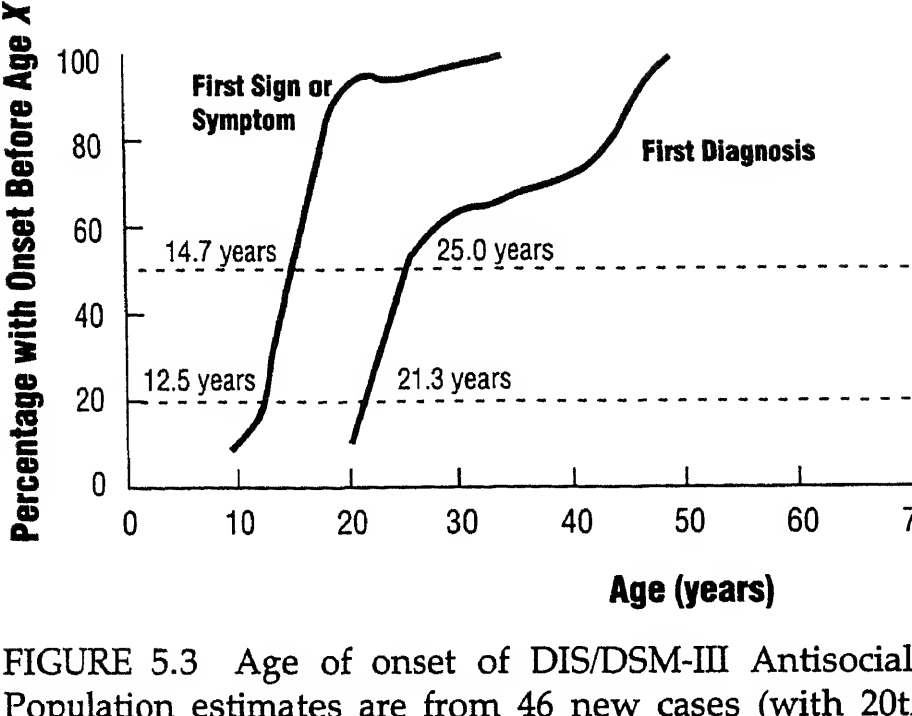



FIGURE 5.3 Age of onset of DIS/DSM-III Antisocial
Population estimates are from 46 new cases (with 20t
marked). Source: NIMH Epidemiologic Catchment Area
to 1983.

1992) has suggested that conduct disorder is not a
series of conditions, but rather an emotional or be
disorder analogous to fever as a marker of infectio
suggested, alternatively, that conduct disorder mi
as the middle phase of a chronic mental disorder
early in life and continues into adulthood but wh
time along the way. DSM recognizes the chronicit
labels it differently at each stage. Taylor and co
children meeting the criteria for conduct disorder
neous in their symptoms (Taylor, Schachar, Thor
1986). This heterogeneity adds support to the in
that conduct disorder is really a cluster of disorde

ming, Blum, and Grant, 1989a; Velez, Johnson, and Cohen, 1
l, Canino, Rubio-Stipec, Gould, Ribera, Sesman et al., 1988; An
, Williams, McGee, and Silva, 1987; Offord, Boyle, Szatmari,
nt, Links, Cadman et al., 1987). The costs to society of having
gh prevalence are not known, but obviously they are high, for
ude the costs of damage to other people's property, the cos
cational, legal, and social service interventions, and the costs of
otential and eventual productivity of these individuals. Con
rder is not easily treated. Although many treatments are b
lied and some, including problem-solving skills training, pa
nagement training, and functional family therapy, have achi
itive short-term outcomes (Kazdin, 1993), the long-term succes
se interventions is not known.

ymptoms of conduct disorder may arise from many different p
ys. Loeber and colleagues (Loeber, Wung, Keenan, Gir
uthamer-Loeber, Van Kammen, and Maughan, 1993) have po
d three routes: (1) an aggressive-versatile route with early or
n symptoms that are already severe in preschool; (2) a nonagg
, antisocial pathway with onset in late childhood to early ad
ce, with conduct problems but no hyperactivity or aggression;
an exclusive substance abuse pathway with onset in middle to
lescence. There is a marked difference between the early-onset
conduct disorder in a temperamentally difficult child who
ompanying attention deficit disorder and learning difficulties,
late-onset form appearing in an adolescent who has previo
ctioned well but who in response to environmental stress sudd
nges patterns of behavior. Robins's (1980) work has suggested
-onset conduct disorder is typically predated by early experime
with sex, drugs, and alcohol. Adolescents who are most likely
onically antisocial are those who show early-onset, pervasive d
and co-occurrence of early hyperactivity White, Moffitt, E

function reasonably well in school and with their p
1992; Weiss and Hechtman, 1986).

Conduct disorder is important not only because o
frequency and occurrence with other disorders, but
persistence into adolescence and adulthood. In one c
percent of boys and 1.6 percent of girls aged 6 to 11
boys and 4.1 percent of girls aged 12 to 16 were di
conduct disorder (Offord et al., 1989a). Forty percer
conduct disorder between ages 8 and 12 still ha
follow-up four years later (Offord et al., 1992). Still
had conduct disorder at 8 to 12 years had substance
four years later, although they did not show other
disorder. The pattern of conduct disorder symptoms
later drug abuse or delinquency is a combination
shyness (Moskowitz and Schwartzman, 1989; McC
Brown, Rubin, and Einsminger, 1983). Aggression ac
rejection, rather than aggression alone, predicts
Furthermore, 50 percent of adolescents with conduc
show persistent antisocial disorders in adult life
1983). Conduct disorder not only predicts later m
adulthood but also has wide-ranging poor prognosi
higher rates of school failure, joblessness, and poor i
especially marital difficulties (Robins, 1970). As adult
externalizing disorders (such as antisocial persona
alcohol and drug abuse) than females, and females h
izing disorders (such as mood and anxiety disorders

The antisocial behavior patterns that form the c
disorder diagnosis show considerable stability ov
When the patterns that had their onset in childho
continue into adulthood, the name of the disorde
diagnostic criteria remain very similar. For the DSM

## BLE 5.2 DSM-III-R Diagnostic Criteria for Antisocial Personali order

Current age at least 18.

Evidence of Conduct Disorder with onset before age 15, as indicated by a histo *hree* or more of the following:

(1) was often truant
(2) ran away from home overnight at least twice while living in parental or parental surrogate home (or once without returning)
(3) often initiated physical fights
(4) used a weapon in more than one fight
(5) forced someone into sexual activity with him or her
(6) was physically cruel to animals
(7) was physically cruel to other people
(8) deliberately destroyed others' property (other than by fire-setting)
(9) deliberately engaged in fire-setting
10) often lied (other than to avoid physical or sexual abuse)
11) has stolen without confrontation of a victim on more than one occasion (including forgery)
12) has stolen with confrontation of a victim (e.g., mugging, purse-snatching extortion, armed robbery)

A pattern of irresponsible and antisocial behavior since the age of 15, as indica by at least *four* of the following:

(1) is unable to sustain consistent work behavior, as indicated by any of the following (including similar behavior in academic settings if the person is student):
   (*a*) significant unemployment for six months or more within five years v expected to work and work was available
   (*b*) repeated absences from work unexplained by illness in self or family
   (*c*) abandonment of several jobs without realistic plans for others
(2) fails to conform to social norms with respect to lawful behavior, as indica by repeatedly performing antisocial acts that are grounds for arrest (whet arrested or not), e.g., destroying property, harassing others, stealing,

TABLE 5.2 (*Continued*)

(6) has no regard for the truth, as indicated by repea "conning" others for personal profit or pleasure
(7) is reckless regarding his or her own or others' pe driving while intoxicated, or recurrent speeding
(8) if a parent or guardian, lacks ability to function a indicated by one or more of the following:

(*a*) malnutrition of child
(*b*) child's illness resulting from lack of minimal
(*c*) failure to obtain medical care for a seriously
(*d*) child's dependence on neighbors or nonresi shelter
(*e*) failure to arrange for a caretaker for young c from home
(*f*) repeated squandering, on personal items, of household necessities

(9) has never sustained a totally monogamous relati year
(10) lacks remorse (feels justified in having hurt, mist another)

D. Occurrence of antisocial behavior not exclusively durin Schizophrenia or Manic Episodes.

SOURCE: American Psychiatric Association, 1987, pp. 344–34

it occurred in about 2.5 percent of the populatio to the point of the interview (Robins and Reg personality disorder, the diagnostic requireme begin before age 15 ensures that the curve o reaches nearly 100 percent prior to the age of 1 and symptoms over the life course led to indivi criteria for antisocial personality disorder for th of follow-up. Twenty percent of cases first

are discussed below, with somewhat more detail gi
depressive disorder, which has greater severity. Freque
referred to here jointly as depressive disorders. Both are
inclusion and exclusion criteria based on severity of s
Tables 5.3 and 5.4). In general, the clinical picture involv
mood disturbance with feelings of sadness and loss
pleasure in most activities in conjunction with disturba
appetite, concentration, libido, and energy.

Depressive disorders are common and are associated wi
at all levels of functioning. There have been remark
advances in the understanding of depressive disorders
three decades. These have included the development and
reliable methods to diagnose depressive disorders, to
course, outcome, and associated impairments, and to
underlying biological changes that accompany them.

Some people have only a single major depressive ep
entire lifetime; following it, they return to their prev
functioning. However, about 50 percent of those in clinica
have one episode will go on to have another (Americ
Association, 1987), thus meeting the criteria for recurrent
sion and underscoring the need to prevent the first e
women are much more likely than men to have maj
disorder, with the lifetime prevalence being 8.7 percent f
3.6 percent for men (Robins and Regier, 1991). Dysthym
disorder, but the symptoms are chronic (two years in a
year in children).

Depressive disorders have a substantial cost to societ
productivity, they are responsible for more missed days
any other health problem with the exception of cardiov
ders. They are the most common of all health problems e
primary care ph sicians in their offices. Estimates of

*Major Depressive Episode*

**Note:** A "Major Depressive Syndrome" is defined as criterion A b

A. At least five of the following symptoms have been present du
period and represent a change from previous functioning; at l
is either (1) depressed mood, or (2) loss of interest or pleasure
symptoms that are clearly due to a physical condition, mood-
hallucinations, incoherence, or marked loosening of associatio

(1) depressed mood (or can be irritable mood in children and ad
nearly every day, as indicated either by subjective account o
(2) markedly diminished interest or pleasure in all, or almos
day, nearly every day (as indicated either by subjective a
others of apathy most of the time)
(3) significant weight loss or weight gain when not dieting (
weight in a month), or decrease or increase in appetite n
children, consider failure to make expected weight gains
(4) insomnia or hypersomnia nearly every day
(5) psychomotor agitation or retardation nearly every day (o
merely subjective feelings of restlessness or being slowed
(6) fatigue or loss of energy nearly every day
(7) feelings of worthlessness or excessive or inappropriate gu
delusional) nearly every day (not merely self-reproach or
(8) diminished ability to think or concentrate, or indecisiven
by subjective account or as observed by others)
(9) recurrent thoughts of death (not just fear of dying), recu
without a specific plan, or a suicide attempt or a specific

B. (1) It cannot be established that an organic factor initiated and n
(2) The disturbance is not a normal reaction to the death of
Bereavement)

**Note:** Morbid preoccupation with worthlessness, suicida
functional impairment or psychomotor retardation, or pr
bereavement complicated by Major Depression.

C. At no time during the disturbance have there been delusions
long as two weeks in the absence of prominent mood sympto
symptoms developed or after they have remitted).

D. No superimposed on Schizophrenia, Schizophreniform Disor

TABLE 5.3 (*Continued*)

**2-Moderate:** Symptoms or functional impairment between "mild" and

**3-Severe, without Psychotic Features:** Several symptoms in excess of t make the diagnosis, **and** symptoms markedly interfere with occupatio with usual social activities or relationships with others.

**4-With Psychotic Features:** Delusions or hallucinations. If possible, **spe** psychotic features are *mood-congruent* or *mood-incongruent*.

**Mood-congruent psychotic features:** Delusions or hallucinations whos entirely consistent with the typical depressive themes of personal inad disease, death, nihilism, or deserved punishment.

**Mood-incongruent psychotic features:** Delusions or hallucinations wh *not* involve typical depressive themes of personal inadequacy, guilt, di nihilism, or deserved punishment. Included here are such symptoms delusions (not directly related to depressive themes), thought insertion broadcasting, and delusions of control.

**5-In Partial Remission:** Intermediate between "In Full Remission" and previous Dysthymia. (If Major Depressive Episode was superimposed diagnosis of Dysthymia alone is given once the full criteria for a Major Episode are no longer met.)

**6-In Full Remission:** During the past six months no significant signs o disturbance.

**0-Unspecified.**

**Specify chronic** if current episode has lasted two consecutive years withou months or longer during which there were no significant depressive symp

**Specify** if current episode is **Melancholic Type.**

*Major Depression*

296.2x Major Depression, Single Episode

**For fifth digit, use the Major Depressive Episode codes (p. 223) to describ**

A. A single Major Depressive Episode (p. 222).

B. Has never had a Manic Episode (p. 217) or an unequivocal Hypomanic Epi

## TABLE 5.4 DSM-III-R Diagnostic Criteria for Dysth

A. Depressed mood (or can be irritable mood in children and ad
the day, more days than not, as indicated either by subjectiv
observation by others, for at least two years (one year for chi

B. Presence, while depressed, of at least two of the following:
(1) poor appetite or overeating
(2) insomnia or hypersomnia
(3) low energy or fatigue
(4) low self-esteem
(5) poor concentration or difficulty making decisions
(6) feelings of hopelessness

C. During a two-year period (one-year for children and adolesce
disturbance, never without the symptoms in A for more than

D. No evidence of an unequivocal Major Depressive Episode du
(one year for children and adolescents) of the disturbance.

**Note:** There may have been a previous Major Depressive Epi
was a full remission (no significant signs or symptoms for six
development of the Dysthymia. In addition, after these two y
children or adolescents) of Dysthymia, there may be superim
Major Depression, in which case both diagnoses are given.

E. Has never had a Manic Episode (p. 217) or an unequivocal H
p. 217).

F. Not superimposed on a chronic psychotic disorder, such as S
Delusional Disorder.

G. It cannot be established that an organic factor initiated and m
disturbance, e.g., prolonged administration of an antihyperte

**Specify primary** or **secondary type:**

**Primary type:** the mood disturbance is not related to a preexi
nonmood, Axis I or Axis III disorder, e.g., Anorexia Nervosa

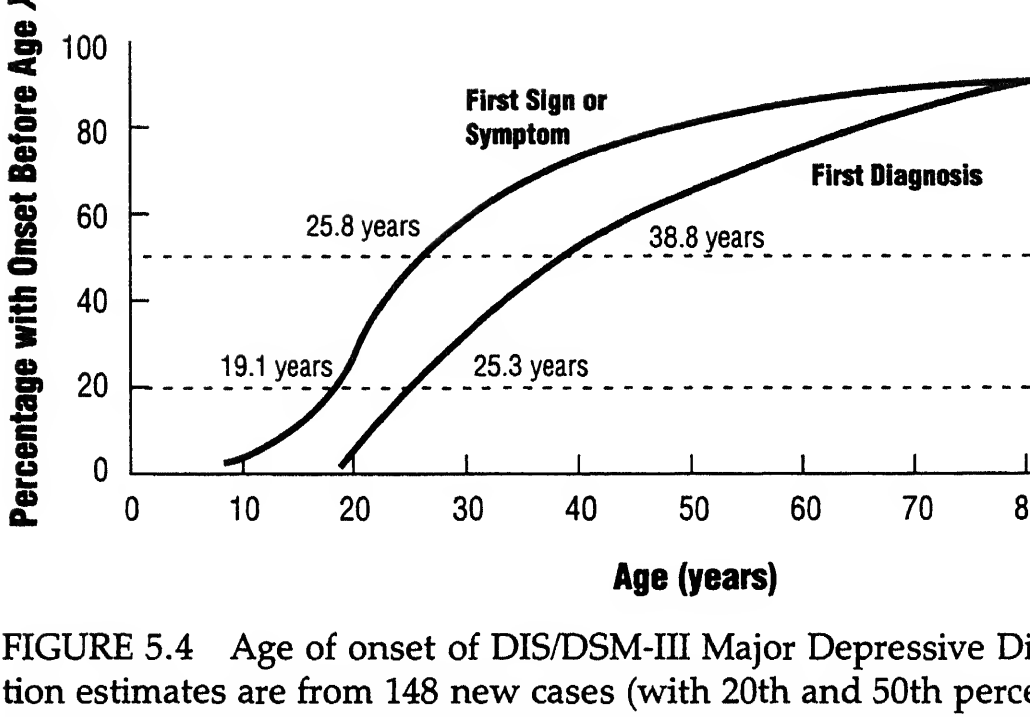



FIGURE 5.4 Age of onset of DIS/DSM-III Major Depressive Di
tion estimates are from 148 new cases (with 20th and 50th perce
Source: NIMH Epidemiologic Catchment Area Study, Four Site

suicide than as a result of homicide (National Cent
Statistics, 1993). Although the definitions of depression
many studies link depression and suicide. More than h
occur in adults suffering from depression (Barraclough, B
and Sainsbury, 1974). The lifetime risk of suicide in per
from depression is 15 percent (IOM, 1990a). The risk of
depressed persons of all ages is 30 times higher than i
population (Guze and Robins, 1970). Twenty percent
occur in persons over 65 (Vital Statistics of the United
Rates are strikingly higher for elderly white men than for

Both pharmacological and psychological treatment me
pression have shown considerable success (Klerman, 198
1988). There is also evidence that high-quality mainte

However, there is strong evidence that clinical depr
underrecognized and undertreated in medical prac
Miranda, Muñoz, and Ying, 1990; Cleary, Goldberg, F
1982) and that treatment is often suboptimal (Kel
Coryell, and Hirschfeld, 1986). It is evident that adul
disorders, if they are treated at all, are often treated
general practitioners, not mental health specialists (
and Taube, 1978). This has prompted the Agency for
and Research to publish clinical practice guidelines
primary care (Depression Guideline Panel, 1993a,b,c).
accumulated that children with serious mental disord
clinical depression in particular (Beardslee, Keller, L
Sacks, 1993; Keller, Lavori, Beardslee, Wunder, and R
undertreated. In addition, Mexican-Americans and p
norities as well, significantly underutilize mental hea
in need of treatment for mental disorders in general.
study, utilization rates were low for the general
percent, but for Mexican-Americans rates were onl
percent (Hough, Landsverk, Karno, Burnam, Timb
Regier, 1987).

A developmental perspective is necessary in the
depressive disorders because the nature of clinical de
across the life span. Estimates of the rate of depress
vary depending on the instruments and diagnostic s
and on the samples studied. A useful technique is a str
scored according to standard diagnostic criteria, such a
system used in the ECA study. ECA data suggest a
disorder rate of 7.8 percent for all affective disorders
mood disorders in DSM-III-R), with major depres
common affective disorder, followed by dysthymia (

among elderly people in nursing homes range from 15
(NIH Consensus Development Panel on Depression in L
Major depressive disorder among children is rarer than
as reviewed in more detail below.

There appears to be a cohort effect in the prevalence
disorder. Birth cohorts born in successive decades in this
higher prevalence of depression (Klerman, Lavori, Rice, R
Andreason et al., 1985; Hagnell et al., 1982). The increase
to some extent, parallels the increase in suicide. Recen
shown that for the United States and several other nat
recent birth cohorts are at increased risk for major dep
National Collaborative Group, 1992).

In the ECA study, which included only persons age 18
did not assess childhood or adolescent depression, ma
disorder was shown to have its onset in young adulthoo
Twenty percent of cases met criteria for diagnosis for
before the age of 25.3 years, and 50 percent before
prodromal period appeared to be about 6 years long
earlier onset, and more than 10 years long for those wit

## Alcohol Abuse and Dependence

Drinking problems generally are viewed as a contin
from occasional misuse by social drinkers to alcohol abu
dence. In DSM-III-R, alcohol is one of nine classes o
substances associated with abuse and dependence. Alco
maladaptive use pattern, demonstrated by either continu
knowledge of harmful effects or recurrent use in situatio
physically hazardous, as well as symptoms that have p
least one month or have occurred repeatedly over a lo
time. Abuse of alcohol progresses to alcohol dependen

## TABLE 5.5 DSM-III-R Diagnostic Criteria for Psyc Abuse and Psychoactive Substance Dependence

*Psychoactive Substance Abuse*

A. A maladaptive pattern of psychoactive substance use indica the following:
   (1) continued use despite knowledge of having a persister occupational, psychological, or physical problem that i by use of the psychoactive substance
   (2) recurrent use in situations in which use is physically h while intoxicated)

B. Some symptoms of the disturbance have persisted for at lea occurred repeatedly over a longer period of time.

C. Never met the criteria for Psychoactive Substance Depende

*Psychoactive Substance Dependence*

A. At least three of the following:
   (1) substance often taken in larger amounts or over a long person intended
   (2) persistent desire or one or more unsuccessful efforts to substance use
   (3) a great deal of time spent in activities necessary to get theft), taking the substance (e.g., chain smoking), or re
   (4) frequent intoxication or withdrawal symptoms when e role obligations at work, school, or home (e.g., does n hung over, goes to school or work "high," intoxicated or her children), or when substance use is physically h when intoxicated)
   (5) important social, occupational, or recreational activities because of substance use
   (6) continued substance use despite knowledge of having social, psychological, or physical problem that is cause use of the substance (e.g., keeps using heroin despite

TABLE 5.5 (*Continued*)

**Criteria for Severity of Psychoactive Substance Dependence:**

**Mild:** Few, if any, symptoms in excess of those required to make the the symptoms result in no more than mild impairment in occupation usual social activities or relationships with others.

**Moderate:** Symptoms or functional impairment between "mild" and

**Severe:** Many symptoms in excess of those required to make the dia symptoms markedly interfere with occupational functioning or with activities or relationships with others.[a]

**In Partial Remission:** During the past six months, either no use of th some symptoms of dependence.

**In Full Remission:** During the past six months, either no use of the of the substance and no symptoms of dependence.

[a]Because of the availability of cigarettes and other nicotine-containing absence of a clinically significant nicotine intoxication syndrome, impair or social functioning is not necessary for a rating of severe Nicotine De

SOURCE: American Psychiatric Association, 1987, pp. 167–169.

regulate alcohol intake. Physical dependence is an adap ifested by intense physical disturbances that occur wh discontinued. Dependence results from the adaptation vous system structures and functions (and probably organs as well) to the presence of alcohol. Tolerance diminished effect of a given amount of alcohol that te with regular use. In spite of this diminished effect, l aspects of brain functioning are impaired, and vital damaged.

Alcohol is involved in over 100,000 deaths annually States (from motor vehicle crashes, unintentional injurie the medical effects of alcohol dependence) and plays

Because of the heterogeneity of age of onset and
maladaptive use of alcohol, Cloninger and colleag
vardsson, Gilligan, von Knorring, Reich, and B
postulated two different forms of alcoholism: Typ
Chapter 6).

Alcohol has effects on virtually every organ syst
liver, the primary site of alcohol metabolism, is su
three major types: fatty liver, alcoholic hepatitis, a
alcohol abusers also may develop clinical signs of
Heavy alcohol consumption is a well-documented
age. Damage can result from alcohol's toxic effects;
age to other organs can impair proper brain functi
dietary habits that frequently accompany chronic
nutritional imbalances that, in turn, can impair t
Neurological complications include dementia, blac
lucinations, and peripheral neuropathy. Alcohol-r
counts for nearly 20 percent of all admissions to st
Moreover, heavy drinking can seriously impair a
remember and to perform intellectual tasks. The re
imaging techniques has enabled researchers to iden
abnormalities in the brain—possibly resulting from
may account for the impaired intellectual and m
addition, autopsy studies have shown that alcoholi
atrophy as well as specific cell loss in at least two st
that control memory (DHHS, 1990). Alcohol also ca
endocrine, and reproductive systems and may
increased risk of certain kinds of cancers, especial
mouth, esophagus, and larynx.

Alcohol even reaches across generations by c
syndrome (FAS), a cluster of permanent physi
mental retardation in the newborn child that resul

to 30 percent of alcoholics have panic disorder, and abou
persons with anxiety disorders abuse alcohol (DHHS, 19
also indicate that persons dependent on alcohol are more
drugs. The increased odds ratios are as follows: cocai
sedatives (17 times); opioids (13 times); hallucinogens (12
lants (11 times); and marijuana or related drugs (6 times). S
clinical and nonclinical populations indicate that at least
alcohol-dependent persons are also nicotine dependent (D

Despite the national downward trend in alcohol cons
jections for 1995 suggest that 11.2 million adults will exh
of alcohol dependence, while the number of alcohol abus
at current levels (DHHS, 1990). More men than wom
drinkers. For both men and women, drinking problems
common among younger age groups. In a 1984 nation
example, the proportion of male drinkers reporting at lea
level of drinking problems was highest among those age
both dependence symptoms (14 percent) and drinking-
quences (20 percent). The proportions dropped with in
reaching respective lows of 5 and 7 percent among men
older. Among female drinkers, the proportion report
moderate level of dependence symptoms remained sta
percent from age 18 to age 49 and then dropped to 1
drinking-related consequences, the proportion reporti
moderate level of problems was relatively high in the 18-t
(12 percent), but dropped to 6 percent for women in the
forties and was negligible for those aged 60 and older (H

There are characteristics other than gender and age tha
patterns of alcohol consumption; one of these is homeles
who are homeless have higher levels of alcohol abuse an
than the general population, with prevalence estimates ra
to 45 percent and estimates of lifetime prevalence as high

extent from alcohol-related problems. A survey condu
that while white males were at highest risk for alcoh
the 18-to-29 age group, African-American males of si
much lower risk. For men in their thirties, howe
increased sharply for African-Americans and dec
whites. Problem rates remained higher for African-A
whites throughout middle and old age. African-Ar
reported higher rates of drinking-related problems
and social) than white males (Herd, 1989). One poss
the high level of health problems among African-Am
later onset of heavy drinking. This late onset may
more sustained patterns of high consumption, in c
among whites, for whom heavy drinking is more li
term phenomenon at a younger age.

Hispanics have a higher prevalence of drinking-rel
other racial and ethnic groups, despite the fact th
abstain from drinking. A representative national sam
1984 revealed marked differences in alcohol consum
and women. Approximately 70 percent of Hispa
drinking more than once a month, whereas almost th
of Hispanic women drank either less than once a
(Caetano, 1989). Rates of heavier drinking increas
Hispanic men in their thirties but declined thereafte
of the men experienced at least one alcohol-related
year preceding the survey. Problem rates varied
much higher proportions of Mexican-American men
than did Puerto Ricans or Cubans.

Native American and Native Alaskan groups var
use, but as a whole they have very high mortality
related causes. The 1985 age-adjusted rate for alc

lished reporting outcome data on various treatment met
the areas covered include pharmacotherapies, aversion t
chotherapy and counseling, mutual-help groups such
Anonymous, behavioral self-control training, and relap
procedures. Typically, alcohol treatment programs offer
of modalities, ranging from detoxification and health c
tional therapy and after-care group meetings. Even tho
can be effective, however, many alcohol-dependent ind
do not seek help or resist treatment, and most patient
least one relapse to drinking following treatment.

To better understand the benefits of treatment and
percentage of patients who experience those benefits,
working to define the active ingredients of various trea
and to determine which patient factors influence trea
(NIAAA, 1991). Related efforts include refining diagn
tions; developing improved tools for screening, diagno
ment; and improving treatment outcome evaluation.

Researchers also are working to provide information
ensure that treatment services reach the populations in
well established that general medical expenditures b
their families are reduced substantially following tre
benefits derived from treating alcoholics offset cost
health care system (IOM, 1990b; IOM, 1989a). In light
increasing efforts will focus on expanding information
ities, quality, availability, utilization, and costs of alco
services in relation to the need and the demand for th

Alcohol abuse and dependence is present in abou
adult population at any given time (point prevalenc
about 14 percent of the population over the life cour
lence) (Helzer, Burnam, and McEvoy, 1991). It begin
cence (Fi ure 5.2). The twentieth percentile for age of

A. Presence of characteristic psychotic symptoms in the activ
(3) for at least one week (unless the symptoms are success

(1) two of the following:
(*a*) delusions
(*b*) prominent hallucinations (throughout the day for
times a week for several weeks, each hallucinator
limited to a few brief moments)
(*c*) incoherence or marked loosening of associations
(*d*) catatonic behavior
(*e*) flat or grossly inappropriate affect

(2) bizarre delusions (i.e., involving a phenomenon that
would regard as totally implausible, e.g., thought bro
controlled by a dead person)

(3) prominent hallucinations [as defined in (1)(*b*) above] c
having no apparent relation to depression or elation,
running commentary on the person's behavior or thou
voices conversing with each other.

B. During the course of the disturbance, functioning in such
relations, and self-care is markedly below the highest level
the disturbance (or, when the onset is in childhood or ado
achieve expected level of social development).

C. Schizoaffective Disorder and Mood Disorder with Psychoti
ruled out, i.e., if a Major Depressive or Manic Syndrome h
during an active phase of the disturbance, the total duratio
mood syndrome has been brief relative to the total duratio
residual phases of the disturbance.

D. Continuous signs of the disturbance for at least six months
must include an active phase (of at least one week, or less
successfully treated) during which there were psychotic sy
Schizophrenia (symptoms in A), with or without a prodro
defined below.

*Prodromal phase*: A clear deterioration in functioning before
disturbance that is not due to a disturbance in mood or to
Use Disorder and that involves at least two of the symptor

*Residual phase:* Following the active phase of the disturbanc
two of the symptoms noted below, these not being due to
to a Psychoactive Substance Use Disorder

(4) marked impairment in personal hygiene and grooming
(5) blunted or inappropriate affect
(6) digressive, vague, overelaborate, or circumstantial speech, or poverty speech, or poverty of content of speech
(7) odd beliefs or magical thinking, influencing behavior and inconsistent cultural norms, e.g., superstitiousness, belief in clairvoyance, telepath sense," "others can feel my feelings," overvalued ideas, ideas of refer
(8) unusual perceptual experiences, e.g., recurrent illusions, sensing the p of a force or person not actually present
(9) marked lack of initiative, interests, or energy

*Examples:* Six months of prodromal symptoms with one week of symptoms no prodromal symptoms with six months of symptoms from A; no prodro symptoms with one week of symptoms from A and six months of residual symptoms.

E. It cannot be established that an organic factor initiated and maintained the disturbance.

F. If there is a history of Autistic Disorder, the additional diagnosis of Schizo made only if prominent delusions or hallucinations are also present.

**Classification of course.** The course of the disturbance is coded in the fifth dig

**1-Subchronic.** The time from the beginning of the disturbance, when the p first began to show signs of the disturbance (including prodromal, active, a residual phases) more or less continuously, is less than two years, but at le months.

**2-Chronic.** Same as above, but more than two years.

**3-Subchronic with Acute Exacerbation.** Reemergence of prominent psycho symptoms in a person with a subchronic course who has been in the resid of the disturbance.

**4-Chronic with Acute Exacerbation.** Reemergence of prominent psychotic symptoms in a person with a chronic course who has been in the residual the disturbance.

**5-In Remission.** When a person with a history of Schizophrenia is free of a of the disturbance (whether or not on medication), "in Remission" should coded. Differentiating Schizophrenia in Remission from No Mental Disorde

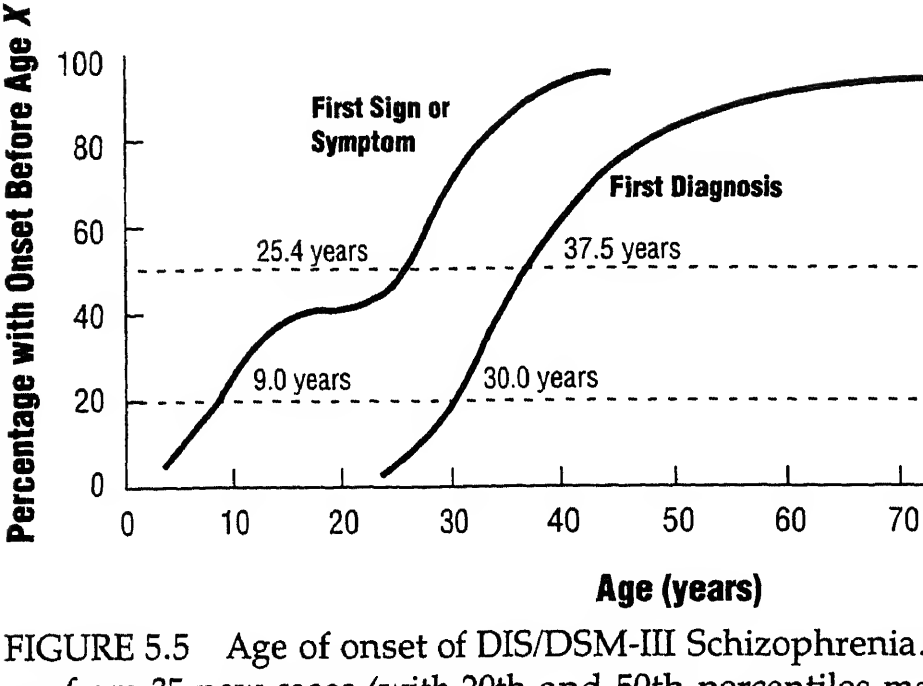



FIGURE 5.5 Age of onset of DIS/DSM-III Schizophrenia. are from 35 new cases (with 20th and 50th percentiles ma Epidemiologic Catchment Area Study, Four Sites, 1978 to

changed somewhat from DSM-III and are likely DSM-IV. Also, the definition in the U.S. classifica somewhat from that in the diagnostic system used The establishment of criteria has been complicate schizophrenia has been considered by some to be phrenias" (Bleuler, 1950). From the time of Kraepel and course have been used to group illnesses unde label, but valid subtyping of these illnesses has no because etiological factors are not yet clear. In gener characterized by delusions and hallucinations, disor behavior, deficits in social, emotional, expressive, a iors, and a lack of motivation leading to decreased tional functioning.

et of schizophrenia. The course of the disorder is usually
ignant during its first 5 to 10 years; it then tends to stabilize and
n improve somewhat. The course also depends on the quality
ntity of available treatment and rehabilitation (Harding, 1988).
eith, Regier, and Rae (1991, p. 34) have described these social
nomic costs:

> ents with the disorder occupy over 30 percent of the nation's mental ho
> —more than 100,000 beds on any given day (Manderscheid and Ba
> ). Treatment costs alone exceed $7 billion annually, and indirect costs
> nple, of social services, loss of productivity, and premature morta
> unt for at least double that figure, making the financial burden of sc
> enia in the United States approximately equal to that of all cancers coml
> , Goldstein, Andrews, Lapsley, Bartel, and Silove, 1985; Gunderson
> er, 1975). The demoralizing effects of this devastating illness are p
> aled by the exceptionally high suicide attempt and completion rate
> ms. Past clinical studies have estimated that one in four patients
> zophrenia will attempt suicide and one in ten will succeed in the firs
> s of the illness (Roy, 1986; Winokur and Tsuang, 1975). Further, comp
> he general population, persons with schizophrenia have a twofold inc
> verall mortality, with excess mortality particularly likely to be cause
> natural death" (Allebeck and Wistedt, 1986). Schizophrenic patients a
> test risk for premature death are those younger than 40 years (Black
> okur, 1988).

he co-morbidity of schizophrenia with substance abuse is a n
blem and can complicate the initial diagnosis. For patients
onic schizophrenia who are in either state or Department of Vete
irs hospitals, alcohol and drug abuse appear to dominate as c
g conditions, with some 20 to 50 percent of such hospita
nts having drug and alcohol problems (Shaner, Khalsa, Rob
kins, Anglin, and Hsieh, 1993). The lower rates are often biase
lid reports given by the patients themselves. Shaner et al. (

schizophrenic patient exhibits symptoms consistent with either affective disorders (60 percent) or anxiety disorders (60 percent) (Robins and Regier, 1991). However, a careful analysis of these results suggests that the symptoms that give rise to the second diagnosis may well be part of the original illness. In other words, depressive or anxiety symptoms may exist in the normal course of schizophrenia, not as separate diseases. Nevertheless, when such symptoms do coexist, they need to be identified and targeted for treatment.

Significant progress has been made in the reduction of the adverse outcomes of schizophrenia. Structural, educational, and behaviorally based treatments, such as skills training, and interventions that promote family coping and support, when combined with antipsychotic medication have substantially improved the course of psychosis and reduced the relapse rate (Falloon and Fadden, 1993; Liberman, 1992; Wyatt, 1991). The favorable impact of continuous and comprehensive treatment is readily observed in one- and two-year controlled clinical trials, but it has only begun to be established for longer periods. The efficacy of treatment for primary negative symptoms and for the subset of patients with persistent psychosis has improved with the use of new antipsychotic medications and social learning programs (Glynn and Mueser, 1992; Kuehnel, Liberman, Marshall, and Bowen, 1992; Meltzer, 1992; Brenner, Dencker, Goldstein, Hubbard, Keegan, Kruger et al., 1990).

The estimated annual incidence of schizophrenia across the world appears to range between 0.1 and 0.5 per 1,000 (Eaton, 1991). The lifetime prevalence of schizophrenia is roughly the same for men and women, although women have a later onset. The lifetime risk of schizophrenia in the general population in the United States is 1.0 percent. That is, 1 out of 100 people born today will develop schizophrenia by the time they are 55. But of course, not everyone's risk is equal because some have a strong family history of schizophrenia and other risk factors that can multiply the risk for onset of the disorder by tenfold or greater.

Schizophrenia usually appears after puberty, with the peak age of onset at about 20 to 24 years for males and 25 to 29 years for females (Lewine, 1988). These figures are somewhat misleading because onset is only the point in time that characteristic and florid psychotic symptoms bring the individual to psychiatric attention. A broader description of onset suggests a range of about 17 to 28 for males and about 20 to 40 for females. First-episode studies suggest that psychotic symptoms have been present for about two years (Mintz, Mintz, and Goldstein, 1987; Goldberg and Huxley, 1980) at the time of initial diagnostic and

treatment services (Lieberman, Jody, Geisler, Alvir, Loeber, Szymanski et al., 1993). However, there are obvious problems in using mental health service contacts to determine age of onset. It seems likely that aspects of cognitive dysfunction and prodromal symptoms are present in many patients much earlier in life, and some features may be present from birth. About 10 percent of schizophrenics have their first hospital admission after age 45 (Gottesman, 1991); therefore a criterion in DSM-III that age of onset be before age 45 was dropped in DSM-III-R.

The prodrome for schizophrenia may be surprisingly long, according to ECA data. The first symptoms obtained by questions asking about the onset of hallucinations and delusions suggest that those patients with early onset may have had over-20-year histories of symptoms, whereas those with late onset may have had symptoms for about 12 years. The ECA data confirm that schizophrenia has its onset in young adulthood (Figure 5.5). The twentieth percentile is 30 years of age, and 50 percent of onsets occur prior to age 37.5.

## Alzheimer's Disease

Alzheimer's disease (AD) is the most common cause of deteriorating cognitive function (dementia) in adults. AD accounts for 60 to 70 percent of dementia cases in most studies (Katzman, Lasker, and Bernstein, 1986), although one survey, the East Boston study, found a higher proportion; that is, 91 percent of those with moderate or severe dementia had AD (Evans, Funkenstein, Albert, Scherr, Cook, Chown et al., 1989). The onset of AD is typically heralded by a deterioration in recent memory with relative preservation of reference, or long-term, memory (see Figure 5.6 and Table 5.7 for DSM-III-R diagnostic criteria). The course is insidiously downward, with the progressive loss of the ability to read and write and increasing disability in speaking, learning, and planning of complex actions. The speed of cognitive deterioration varies markedly, and periods of decline are often punctuated by periods of slight recovery or plateaus during which symptoms remain stable for months. At end-stage, the affected person becomes mute, incontinent, and bedridden.

The annual costs of severe dementia have proved difficult to quantify precisely. Two studies of overall costs estimated $38 billion in 1983 dollars, and $24 billion to $48 billion in 1985 dollars (Huang and Hu, 1986; Battelle Memorial Institute, 1984). Diagnostic costs were estimated at between $500 million and $1 billion in 1987 (OTA, 1987), and direct costs of treatment at $10 billion in 1983 (Huang and Hu, 1986).

A recent study of costs, the most rigorous empirical study to date, was

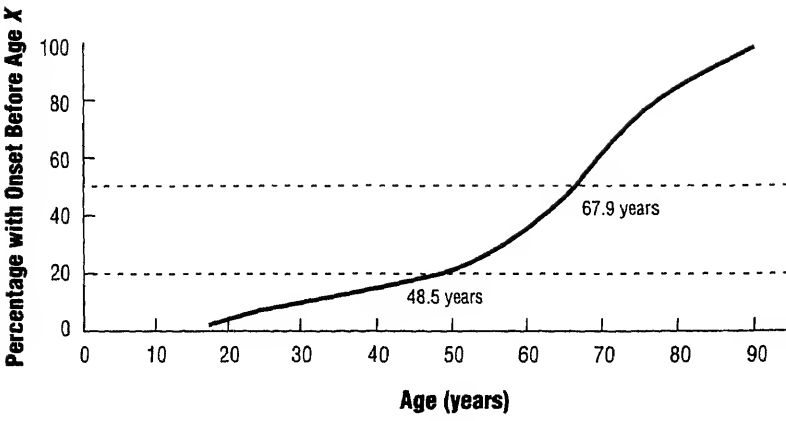



FIGURE 5.6 Age of onset of DIS/DSM-III Cognitive Impairment. Popu estimates are from 187 new cases (with 20th and 50th percentiles ma Source: NIMH Epidemiologic Catchment Area Study, Four Sites, 1978 to

reported by Rice and colleagues (Rice, Fox, Hanck, Max, We Lindeman, and Segura, 1991). The study directly estimated costs cohort of dementia patients from the San Francisco Bay area, institutionalized and residing in the community. This study sugg that previous cost estimates may well have been far too low. The assessed the costs of formal care (including costs for nursing h physician services, hospitals, paid social services, and medications informal care (using cost estimates for services provided by f members or others based on the cost of the same services if perfo by paid substitutes) for dementia patients. The costs per patien nursing home were remarkably similar to the costs per patient i community, approximately $47,000 in 1990, but the fraction of cost to formal services was predictably much higher for those in nu homes. Three quarters of the costs among community-dwelling pa were for informal care. Among nursing home residents, 88 perc the costs were for formal services, with 81 percent for nursing charges alone. The $47,000 cost per patient cannot be gener nationally, but it is more than double the per capita cost estimated previous studies.

The largest cost component is long-term care. Historical da dementia prevalence in nursing homes are notoriously unreliabl the data make clear that dementia is a serious problem among nu home residents. National surveys show that at least half of residing in nursing homes, and perhaps a much higher fraction,

## TABLE 5.7 DSM-III-R Diagnostic Criteria for Primary Degenerative Dementia of the Alzheimer Type and Dementia

*Primary Degenerative Dementia of the Alzheimer Type*

A. Dementia (see p. 107).

B. Insidious onset with a generally progressive deteriorating course.

C. Exclusion of all other specific causes of Dementia by history, physical examination, and laboratory tests.

**Note:** Code 331.00 Alzheimer's disease on Axis III.

*Dementia*

A. Demonstrable evidence of impairment in short- and long-term memory. Impairment in short-term memory (inability to learn new information) may be indicated by inability to remember three objects after five minutes. Long-term memory impairment (inability to remember information that was known in the past) may be indicated by inability to remember past personal information (e.g., what happened yesterday, birthplace, occupation) or facts of common knowledge (e.g., past Presidents, well-known dates).

B. At least one of the following:
   (1) impairment in abstract thinking, as indicated by inability to find similarities and differences between related words, difficulty in defining words and concepts, and other similar tasks
   (2) impaired judgment, as indicated by inability to make reasonable plans to deal with interpersonal, family, and job-related problems and issues
   (3) other disturbances of higher cortical function, such as aphasia (disorder of language), apraxia (inability to carry out motor activities despite intact comprehension and motor function), agnosia (failure to recognize or identify objects despite intact sensory function), and "constructional difficulty" (e.g., inability to copy three-dimensional figures, assemble blocks, or arrange sticks in specific designs)
   (4) personality change, i.e., alteration or accentuation of premorbid traits

C. The disturbance in A and B significantly interferes with work or usual social activities or relationships with others.

D. Not occurring exclusively during the course of Delirium.

E. Either (1) or (2):
   (1) there is evidence from the history, physical examination, or laboratory tests of a specific organic factor (or factors) judged to be etiologically related to the disturbance
   (2) in the absence of such evidence, an etiologic organic factor can be presumed if the disturbance cannot be accounted for by any nonorganic mental disorder, e.g., Major Depression accounting for cognitive impairment

**Criteria for severity of Dementia:**

**Mild:** Although work or social activities are significantly impaired, the capacity for independent living remains, with adequate personal hygiene and relatively intact judgment.

**Moderate:** Independent living is hazardous, and some degree of supervision is necessary.

**Severe:** Activities of daily living are so impaired that continual supervision is required, e.g., unable to maintain minimal personal hygiene; largely incoherent or mute.

SOURCE: American Psychiatric Association, 1987, pp. 107 and 121.

from a dementing disorder (OTA, 1992). The Office of Technolog Assessment estimated that of the $53.1 billion paid for nursing hom care in 1990, $11 billion was dementia-related government expenditure roughly matched by dementia-related out-of-pocket payments fron individuals and families or other private sources (OTA, 1992). The cost of respite care, day care, and informal care through relatives and friend are also significant and were estimated at $27 billion in 1983 (Hu Huang, and Cartwright, 1986; Huang and Hu, 1986). Here again, th more recent study by Rice, although it did not project a national cos figure, suggests that this estimate is probably low by a factor of two o more (Rice et al., 1991).

Data on use and costs of day care, respite care, and other service increasingly available to assist families dealing with a dementing illnes are extremely sparse. Many new services have been created over th past half decade, and most have been created for private payment, a times supplemented by contracts with local or state government, bu with limited federal participation (and thus minimal national dat reporting). The few studies that have been done to assess the use o community services have generally been in service-rich environment with access to case management, and so these studies do not represen the national norm. As uncertain as these cost estimates are, they ar certain to escalate rapidly as the expected prevalence of AD triples ove the next four decades, owing to the aging of the population.

The certain diagnosis of AD requires microscopic examination of brai tissue to look for the distinctive pathological stigmata: neurofibrillar tangles (accumulations of biochemically altered fibrous proteins insid nerve cells) and senile plaques (accumulations of fibrillar protein between nerve cells, concentrated near points of cell-to-cell contact Contrary to previous assumptions that AD represented a rather nor specific age-related deterioration of nerve cells throughout the brain especially in the cerebral cortex, more recent studies have indicated selective pattern of neuronal vulnerability among clusters of cel (Coyle, Price, and DeLong, 1983). Nerve cells in a cluster, called th nucleus basalis of Meynert, preferentially die off (Whitehouse, Price Struble, Clark, Coyle, and DeLong, 1982; Whitehouse, Price, Clark Coyle, and DeLong, 1981). These nerve cells communicate with those i the cortex by releasing the transmitter molecule acetylcholine, a phe nomenon that has led to treatment attempts based on replacing the los of this transmitter. Other neuronal cell clusters in different parts of th brain are also lost selectively, including neurons that use other trans mitters, such as norepinephrine and several short protein molecule (peptides), somatostatin, and corticotropin releasing factor (CRF) (Coyl

et al., 1983). Recent studies have suggested that a loss of synapses in specific brain regions, specifically the hippocampus and association cortex, may be associated with the loss of cognitive abilities in AD (R. Katzman, personal communication, 1993; Terry, Masliah, Salmon, Butters, DeTeresa, Hill et al., 1991; DeKosky and Scheff, 1990; Hamos, DeGennaro, and Drachman, 1989). The clinical and anatomic pattern of neuronal loss is thus more selective than once believed, but nonetheless involves multiple neuronal clusters and transmitter systems. Basic neuroscience as well as clinical studies suggest that the degeneration of these neuronal systems accounts for the cognitive and emotional symptoms of AD (Koo and Price, 1993).

Treatment of AD is confined currently to treating its behavioral and emotional symptoms. Only a small fraction, perhaps 3 to 5 percent, of all dementia cases are truly reversible (Katzman et al., 1986). Although the reversible cases of dementia are not AD, a careful diagnostic assessment is important to identify such cases, so they can be appropriately treated. Treatment of behavioral and emotional symptoms is nonetheless important, as is treatment of any other medical condition the patient may have, to keep the overall level of disability to a minimum (Katzman and Jackson, 1991). Because the overall level of disability, including the agitation, depressive symptoms, behavioral problems, and psychotic symptoms often associated with AD, contributes to family burden—and family burden is the strongest predictor of transfer to a nursing home or other formal care—antidepressants, antipsychotics, antianxiety agents, and other medications to diminish psychosis and behavioral problems are the most commonly used drugs with Alzheimer's patients.

Although the management of behavioral symptoms is important in the daily lives of those with dementia and those who care for them, the research literature on the effectiveness of these management techniques and on the frequency with which AD is co-morbid with other psychiatric symptoms and disorders is sparse (Deutsch and Rovner, 1991). A recent review of AD and depression, for example, found only a single controlled clinical trial (Teri and Wagner, 1992). Despite the weak research base, the use of medications intended to address psychiatric symptoms is common among those with AD. Various surveys suggest that one half to three fourths of those admitted to nursing homes with AD and other dementias are receiving psychotropic medications (OTA, 1992). Indeed, concern about the possible misuse of psychotropic medications has led to regulations in the Omnibus Budget and Reconciliation Act of 1987 intended to thwart misuse. This large gap in the clinical literature has obvious implications for the treatment of those with dementia, and

direct relevance also to preventing sequelae among those who ca them, such as depression in caregivers.

Improved management of psychiatric symptoms associated wit has strong implications for reducing the expression of some of the troublesome aspects of AD. Improved care of AD patients—in h respite care centers, day care centers, clinics, nursing homes, hos and special care units—offers the hope of reducing the load of disability, although research to validate this promise is only prelim

Research advances have been substantial, however, in the a pathophysiology and genetics of AD. We now have reasonable evi that several genetic forms of the illness exist with linkage to at least different chromosomes. This finding suggests that there may collection of specific diseases with a single common pathway. One is that as we understand the nature of the final common pat leading to cell death and discover a marker that will identify indiv at high risk for developing AD, ways can be found to inhibit a step such as amyloid formation and prevent the emergence the il This might lead to indicated preventive interventions for hig individuals.

Conservative estimates suggest that severe dementia afflicts percent of those over age 65 (Cross and Gurland, 1986), and such are expected to number 2.4 million by the year 2000. A comm survey that included mild to moderate symptoms of AD found tha percent of those over age 65 had probable AD (Evans et al., 1989). ECA study, prevalence estimates for severe cognitive impairment highly influenced by the age distribution of the population: in a the prevalence was less than 1 percent; in those over age 5 prevalence was greater than 2 percent (George, Landerman, Blaze Anthony, 1991). The prevalence of AD escalates rapidly after age 6 East Boston study showed that the prevalence of probable AD ros 3 percent among those aged 65 to 74, to 18.7 percent among those 84, to 47.2 percent among those over 85 (Evans et al., 198 mentioned above, the prevalence of AD is expected to increase than threefold during the next four decades, in large part becau oldest segments of the U.S. population, those most at risk for A growing the most rapidly (Evans, Scherr, Cook, Albert, Funker Smith et al., 1990).

Projecting future AD prevalence hinges critically on assum about the growth of the over-85 population and the prevalence of this group, both of which are well-known weak points in the epi ological data. The projected prevalence among those aged 65 would increase only modestly from 1980 to 2050 in one recent p

tion, for example, but would increase sevenfold among those over 85 (Evans et al., 1990). Past census projections have been particularly inaccurate regarding expansion of the oldest age groups, and the anticipated rise of AD over the next four decades is especially sensitive to such uncertainty.

International epidemiological studies have shown relatively little variation among populations in the incidence or prevalence of dementia, when adjusted for late age of onset (Rocca, Hofman, Brayne, Breteler, Clarke, Copeland et al., 1991). Earlier reports had suggested a low incidence and prevalence of AD among Asian populations. More systematic recent studies have found prevalence among Asians within the range of Western surveys (Zhang, Katzman, Kashani, Salmon, Jin, Cai et al., 1990), although the ratio of AD to other causes of dementia may differ between predominantly Caucasian populations, in North America and Europe, and populations in Japan and China (Jorm, 1991). The consistency of findings suggests that AD is found among all geographic areas and population groups. Differences in prevalence from exposure to different risk factors, if they can ultimately be found, are too small to be detected consistently in population surveys.

The onset of severe cognitive impairment in the ECA study is shown in Figure 5.6. In the ECA study, AD was not separated out from other forms of severe cognitive impairment. The operational measure was the Mini-mental Status Exam. The Mini-mental Status Exam is used as a screening tool for dementia, but it also identifies those with cognitive impairments from other causes, such as delirium, substance-induced hallucinosis, and mental retardation. The at-risk population for onset consists of those with a Mini-mental score of 17 or more, and, among these, the new cases are those whose score at the second wave was 17 or less. The respondents' ability to recall the age of onset was limited because of their cognitive impairment. Hence it was not possible to inquire about the age of occurrence of the first prodromal sign or symptom, for those with cognitive impairment at the second wave, and therefore the figure shows only one distribution. Twenty percent of the onsets occurred before the age of 48, and 50 percent occurred before the age of 68.

## GAPS IN OUR KNOWLEDGE

### Age-Specific Prevalence in Children

The most important limitation of the ECA data presented above for the illustrative mental disorders is the truncation at age 18. Although the bias of censorship is avoided, there may be significant numbers of

incident cases before the age of 18. If the cumulative age of ons to include those under 18, that is, the total population, the curve move to the left by an amount equal to the proportion of cases incidence before the age of 18. Unfortunately, the data neces estimate age of onset correctly for the total population do no Available data are either retrospective or do not use standard dia nomenclature.

Lack of prospective data is less important at the level of diagno for the occurrence of the first precursor sign or symptom, diagnosis occurs later. Prospective data are less crucial for schi nia, alcohol abuse or dependence, and cognitive impairment begin later, than for depressive and conduct disorders, whi earlier in life. Prevalence data on major depressive disord published sources are presented in Table 5.8 to give the read indication of how early in life prevention efforts might have to st standard assessment of depression in children and adolesce involved the application of diagnostic interview schedules sc cording to criteria for adults, with no modification for childre these techniques, the prevalence of depression in youngsters u years of age is extremely low, as shown in Table 5.8 (Kash Carlson, 1987). The rate of depression increases by at least sev during adolescence. Major depressive disorder is present in les percent of children before the age of puberty, as shown in the rows of Table 5.8. The lower seven rows show the preva adolescents to be 2 to 8 percent, with one low outlier estim percent (McGee, Feehan, Williams, Partridge, Silva, and Kelly Because the DSM-III diagnosis is required for entry into this tab results are constrained to have been produced after the introdu the DSM-III in 1980. But with the exception of one study (K McGee, Clarkson, Anderson, Walton, Williams et al., 1983), the in Table 5.8 have all been published within the past five ye represent a recent ballooning of information about psychopath children. For both prepubertal and postpubertal ages, the display a relatively large range, with the highest reported pre being about three times the lowest reported prevalence. The e distribution, the locale and culture, and methodological differe presumably contribute to the range of rates shown in Table 5.8. time during late adolescence, the prevalence of major depressiv der approaches that found in the adult population.

Table 5.8 presents point prevalence data, which are useful for tion of need. But incidence data are required to estimate age of o to guide the timing of prevention efforts. Incidence data re

TABLE 5.8 Prevalence Data on DSM-III Major Depressive Disorder in the General Population by Age: A Review of Selected Studies of Children and Adolescents

| Age Range | Current Prevalence[a] | Reference |
|---|---|---|
| 2–6 | 0.9 | Kashani and Carlson, 1987 |
| 9 | 1.8 | Kashani et al., 1983 |
| 6–11 | 2.7[b] | Fleming et al., 1989 |
| 11 | 0.5 | Anderson et al., 1987 |
| 9–12 | 2.5 | Velez et al., 1989 |
| 11–14 | 2.5 | Velez et al., 1989 |
| 15 | 1.2 | McGee et al., 1990 |
| 12–16 | 7.8[b] | Fleming et al., 1989 |
| 14–16 | 4.7 | Kashani et al., 1987 |
| 13–18 | 3.7 | Velez et al., 1989 |
| 14–18 | 2.6 | Lewinsohn et al., 1993 |
| 15–20 | 3.1 | Velez et al., 1989 |

[a]Current prevalence includes point prevalence and one-year or six-month prevalence.
[b]"DMS-III-like" major depressive syndrome; high and medium levels of diagnostic certainty.

NOTE: Studies selected had the following characteristics: they were published in English; they used DSM-III criteria for major depressive disorder; and the general population sample was larger than 100.

prospective design in which lifetime prevalence data are gathered at the baseline, so that an at-risk population can be defined. Only two of the point prevalence estimates in Table 5.8 were accompanied in the original studies by lifetime prevalence data or data that allowed for inference of estimation of lifetime prevalence (Lewinsohn, Hops, Roberts, Seeley, and Andrews, 1993; Kashani et al., 1983). Only one study estimated incidence (Lewinsohn et al., 1993).

The data presented in Table 5.8 display what is known about the epidemiology of major depressive disorder in childhood. Considerable good work has been done for this disorder in particular. The data nevertheless reveal many gaps in knowledge, which present opportunities for further study, discussed in more detail below. Data (not shown) on conduct disorder, would reveal a similarly wide range in estimates and similar gaps in definitive epidemiological knowledge.

### Child Psychiatric Nosology

A series of studies have shown that between 12 and 20 percent of all children suffer from emotional and/or behavioral disorders at some

point in their childhood and that the vast majority are untreated (Offo et al., 1989a,b; also see Chapter 1). There is compelling evidence of t need for much more systematic investigation of the course and natu history of these disorders as well as of preventive intervention studie as was recommended in an IOM report (1989b).

The incidence figures given earlier in this chapter are for ad disorders. Large-scale epidemiological studies are needed to provi compatible data about disorders in children. But even more urgent is t recognition of the need for a developmental perspective. Even thou signs and symptom patterns of serious disturbance vary over the a span of childhood, it is possible at each developmental stage to ident individuals who are seriously disturbed. The use of semistructur diagnostic interviews for mental disorders in children under 8 or 9 yea has only limited value because the validity of applying standard dia nostic criteria is not well-established. Also, impairments in cogniti and social functioning are more important in children, both as outcom and as targets for preventive interventions. Finally, the notion of wh constitutes a case of mental disorder in childhood is less well esta lished—hence the need for broad-based assessment of child functioni in addition to a diagnostic assessment.

Limited knowledge about the development of psychopathology children constrains our ability to engage in preventive interventi efforts. More epidemiological research in the area of developmen psychopathology is needed (Rutter, 1989). The range of prevalen figures for major depressive disorder in children, presented in Table 5 is quite broad, and there is no consensus in these data on the age which major depressive disorder can first manifest itself. Even thoug is possible to operationally define major depression using the DSM- criteria, it is not clear that the disorder is the same in children below t age of puberty, because important features of the disorder, such as t gender ratio, differ in prepubertal versus postpubertal depression. It difficult to define a population "at risk" for onset of disorder a therefore difficult to estimate the age of onset, except in adults, as done in Figures 5.2 through 5.6 above. Ideally, prevention efforts ou to be directed to specific age periods during which the causal eve underlying the disorder are taking place: if the preventive interventi occurs too early, its positive effects may be washed out before onset it occurs too late, the disorder may already have begun. There is consensus on exactly how signs and symptoms should be configu into disorders at various ages. Therefore epidemiological research children should gather and retain data on a wide range of signs a symptoms, as well as disorders, to ensure that maturational changes

changes in the diagnostic classification system do not hamper the ability to study the development of psychopathology over time.

### Empirical Search for Prodromes

The study of precursor signs and symptoms, and prodromal periods, might prove useful in prevention efforts, but there is little knowledge from prospective and population-based data. The precursor signs and symptoms that are most predictive of disorder should be identified in epidemiological surveys, because they might suggest particular indicated preventions. For example, using the same base of data as in Figure 5.4, it is estimated that persons at risk for the first incidence of major depressive disorder, who have in the prior year experienced two weeks or more of sad mood, are 5.5 times more likely to have a first onset of major depressive disorder during the next year as those who have not had this precursor symptom. Individuals who have had the two-week period and symptoms in two or more symptom groups in the diagnostic criterion level B in DSM-III (sometimes called "depression syndrome") have 5.7 times the risk of having a first onset. Estimated relative risks for the criterion B symptom groups are available elsewhere (Dryman and Eaton, 1991).

The formula for estimating attributable risk can be usefully applied to these relative risks if the prevalence of the precursor is known (Eaton, Badawi, and Melton, 1993). For example, the one-year prevalence of a two-week period of sad mood is about 5 percent, but the one-year prevalence of the depression syndrome is only about 0.5 percent. Applying the attributable risk formula to these data yields an estimate of 18.4 percent for sad mood and 2.4 percent for depression syndrome. Therefore, if an efficient screening device could be found, the two-week period of sad mood is a much more logical choice for locating a population for indicated preventive intervention than is the depression syndrome. The yield from application of the formula is not the same as for other risk factors, because precursors that prove to be prodromal are part of the disorder that eventually occurs. But the exercise is useful in quantifying precursors and searching for prodromes. Converting what is known about precursors into true prodromes is an important topic of research for epidemiologists interested in prevention.

### Co-morbidity

The notion of precursor signs and symptoms can usefully be extended to co-morbidity (Kessler and Price, in press . Over the life span, the

mental disorders overlap to a large degree (Regier, Farmer, Rae, L
Keith, Judd, and Goodwin, 1990; Boyd et al., 1984). The stu
epidemiological data on age of onset for co-morbid disorders (to
mine which of two disorders came first) has begun only recently
Merikangas, Eaton, Angst, Kraemer, Canino, Rubio-Stipec et al., 1
The relative risks for symptoms of one disorder, or for the dis
itself, in predicting first onset of a second disorder, are probably
high as for the precursor signs and symptoms that specifically b
within the diagnostic cluster of the second disorder; but these re
risks may be higher than other risk factors, and sufficiently hi
warrant use in screening in some situations. For example, the re
risk for first onset of major depressive disorder for those with a
attack is 3.4, as estimated in a time-dependent proportional ha
model (Andrade, Chilcoat, and Eaton, 1993). The prevalence of
attack is about 10 percent (Eaton, Dryman, and Weissman, 1
Applying the formula for attributable risk yields an estimate
percent. The distinction between indicated preventive intervention
treatment interventions can be further clarified as the precursor s
toms of coexisting disorders become more understood.

## Transition to Adulthood

The transition to adulthood is poorly understood, in spite of th
that it is probably the age period when most adult disorders have
peak rates of incidence. There are prevalence surveys of mental
ders in adults, such as the ECA study, and in children, such as
reviewed in Table 5.8. The ECA study is the only one in the U
States that estimates incidence of specific disorders in adults, and
is only one study estimating incidence rates for a DSM-III disorde
population under age 18 (Lewinsohn et al., 1993). There are no st
that estimate incidence of specific disorders during the age period
transition to adulthood, that is, from about age 15 to about ag
Studies under way using synthetic cohort designs (in which the e
of aging can be studied by using a cross-sectional design that inclu
range of ages but requires strong assumptions about the effects of
cohort and historical period [Beltes, Cornelius, and Nesselroade, 1
have the capacity to yield estimates of incidence, and to study the e
of risk factors that are relatively close to the time of the beginning
study. But synthetic cohort designs will not be able to study the e
of combinations of these risk factors and ones that occur later. Be
these combinations may be very important in the transition to a

hood, this is a stark gap in our epidemiological knowledge relevant to the prevention of mental disorders.

## FINDINGS AND LEADS

- A disorder may be preventable up to the point of onset of first episode. Although onset can rarely be accurately pinpointed, the time at which an individual meets full criteria for diagnosis can be used as an approximation. As more becomes known about precursors and prodromes, the age of onset will become more accurately known.
- Epidemiological research on children and adults should gather and retain data on a wide range of signs and symptoms, as well as disorders, to help ensure that maturational changes and changes in the diagnostic classification system do not interfere with the study of the development of psychopathology over time.
- Prospective epidemiological studies that estimate incidence of specific risk factors and disorders in childhood, adolescence, and during the transition to adulthood, from age 15 to 25, are greatly needed for prevention research. Such studies could help clarify the mechanisms linking risk factors to the first occurrence of disorders.
- For a particular disorder, a review of what is known about prodrome, age of onset, diagnostic criteria, course, co-morbidity, incidence and prevalence, effectiveness of treatment, and costs to society can help the investigator determine if the knowledge base is sufficient to consider designing a preventive intervention. For example, the incidence of a disorder will help determine the necessary size of the sample so that statistical analyses are meaningful (Muñoz and Ying, 1993); the demographics of a disorder will help determine who is at highest risk and what population groups should be targeted; and if a specific treatment is known to be effective, it could be considered for use before onset. Such a review could in turn help policymakers set priorities for preventive intervention programs.
- Many mental disorders, including conduct disorder, depressive disorders, alcohol abuse and dependence, schizophrenia, and Alzheimer's disease, are thought to be a cluster of several different illnesses or to have subtypes. Identification of these groups and clearer delineation of their etiologies may clarify which individuals may be most amenable to preventive interventions.
- Risk factors that have a role in the etiology of a mental disorder may be differentially malleable at different phases of the life course. More research regarding the sensitive periods of risk factors, that is, when they contribute most to etiology, could lead to more strategic

timing of preventive interventions, that is, before or during those sensitive periods.

- From a clinical perspective, the prodromal periods for some of the illustrative mental disorders may seem unusually lengthy. Because the prodromal data presented here were subject to retrospective recall by individuals who currently had a disorder, the time of the first sign or symptom may not be accurate. Also, the signs and symptoms may not have been sufficiently specific to differentiate them from a range of normal behavior. The only way of determining true prodromal periods is through prospective studies with cutoff points for carefully defined signs and symptoms. However, if through such studies prodromal periods are indeed found to be quite lengthy, the timing of preventive interventions may be adjusted accordingly.
- Prospective epidemiological studies could identify precursor signs and symptoms that are below the criterion level for the diagnosis of a mental disorder, as well as the age of the first occurrence of these precursor symptoms. Thus it may be possible to identify individuals at heightened risk for developing the full-blown disorder, who would then become candidates for indicated preventive interventions. For example, populations could be screened for precursors, such as a two-week period of sad mood.
- Research advances in understanding of the cause of Alzheimer's disease (AD) have been substantial. Genetic evidence suggests that AD may be a collection of specific diseases with a single common pathway. If this pathway can be clarified and a marker found to identify individuals at high risk for developing AD, an intervention may eventually be found that could inhibit a crucial step, such as amyloid formation, and prevent emergence of the disease or at least delay its onset.

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# Risk and Protective Factors for the Onset of Mental Disorders

During the past 30 years a growing body of research has elucidated some of the risk factors that predispose children and adults to mental disorder. Recent research has also helped to change the concept of a risk factor from a fixed, specific circumstance or life stress to a broader, more general phenomenon that may be modifiable, or malleable, and related to a developmental phase (Avison, 1992). These findings have led to a shift in risk factor research in both emphasis and complexity.

Risk factors are those characteristics, variables, or hazards that, if present for a given individual, make it more likely that this individual, rather than someone selected at random from the general population, will develop a disorder (Werner and Smith, 1992; Garmezy, 1983). To qualify as a risk factor, therefore, a variable must be associated with an increased probability of disorder and must antedate the onset of disorder. Variables that may be risk factors at one life stage may or may not put an individual at risk at a later stage of development. Risk factors can reside with the individual or within the family, community, or institutions that surround the individual. They can be biological or psychosocial in nature. Some risk factors play a causal role, although this may not be known prior to an intervention study. Others merely mark or identify the potential for a disorder rather than cause the disorder, and for these, therefore, malleability is not an issue. For example, unusual eye movement is often associated with and predates schizophrenia. Its presence increases the likelihood that an individual will develop schizophrenia, but any efforts to alter such eye movements

would be fruitless for preventing schizophrenia because it is not th to have a causal role. The committee uses the term *marker* fo biological and psychosocial risk factors of this sort. Incorporate this definition of risk factor is the concept of vulnerability, whi predisposition to a specific disease process. Vulnerability tra identifiable and measurable (and may sometimes be referred markers). They are not intrinsically the disease, but they m necessary for a specific mental disorder to develop. Having vulne traits may increase an individual's risk for developing a disord other risk factors also may be necessary for the illness to be exp

For years, mental health workers devoted their energies to the of maladaptation and incompetence (Garmezy, 1983) as attempt made to identify patterns of functioning in childhood that portend the future development of mental disorders. Rutter ( described this preoccupation as a "regrettable tendency to gloomily on the ills of mankind and all that can and does go w But not everyone with risk factors goes on to develop a disorder, and the importance of protective factors is becoming recognized. Recently, research has been directed toward under ing why some children appear to be resilient, and why they c maturity relatively unscathed by the organic and psychosocial that prevent so many of their peers from achieving optimal in tual, social, and emotional functioning (Werner and Smith, Werner and Smith (1992) defined resilience as "an unusual or m capacity to recover from or successfully cope with significant st of both internal and external origin." Theoretical explanations phenomenon of resilience (Rutter, 1985b; Garmezy, 1983) invol interaction of risk factors, including individual vulnerabilit protective factors to explain why some are spared and others a Vulnerable individuals are considered to be those who, by vi genetic predisposition, chronic illness, hardship, deprivati abuse, are more susceptible to life stressors than others. Thus are at risk for failure to master, mature and adapt" (O'Grad Metz, 1987). Rutter (1985b) defined protective factors as "those that modify, ameliorate or alter a person's response to some en mental hazard that predisposes to a maladaptive outcome." Pro factors seemingly function in a catalytic fashion. They do not sarily foster normal development in the absence of risk facto they may make an appreciable difference on the influence exer risk factors. Protective factors also can reside with the individual family, community, or institutions and can be biological or psy cial in nature.

Reviews of community surveys and longitudinal epidemiological studies have emphasized that each mental disorder is likely to have multiple risk factors (Hawkins, Catalano, and Miller, 1992; Werner and Smith, 1992; Offord, Boyle, and Racine, 1989; Rutter, 1989; Offord, Boyle, Szatmari, Rae Grant, Links, Cadman et al., 1987). Thus, in order to look for possible opportunities for intervention, it is necessary to identify as many risk and protective factors that impinge on individuals at different stages of development as possible. The process of critically examining risk factor research on mental disorders is part of the foundation for preventive interventions. Not all evidence from risk research is conclusive enough to warrant the design of a preventive intervention. Even where the evidence is strong, it is still worth seeking other potential markers and causal risk factors because targeting multiple risks may increase the success of a preventive intervention program.

This chapter examines the factors that current research indicates may potentially operate to predispose or protect against the occurrence of mental disorders. The examination proceeds first within a categorical framework organized around the five major mental disorders that are used as illustrations throughout this report—Alzheimer's disease, schizophrenia, alcohol abuse and dependence, depressive disorders, and conduct disorder. Because these are disorders in which the relative potential contribution of biological risk factors (including genetic vulnerability) and psychosocial risk factors (including individual, family, and community issues) varies greatly, as a group they provide an opportunity for a review of a wide range of diverse risk factors and the interplay among them. The discussion then moves away from a focus on specific disorders to a broad view of general risk and protective factors that are common to many disorders and dysfunctional states. The sequence of the disorders has been reversed in this chapter and emphasizes the range of risk factors along a continuum from heavily biological to heavily psychosocial.

## ALZHEIMER'S DISEASE

Studies of epidemiology, biochemistry, pathology, and genetics have uncovered several biological risk factors related to Alzheimer's disease (AD), and there is limited evidence for the role of some psychosocial factors, particularly level of education. This section reviews knowledge about biological and psychosocial risk and protective factors for Alzheimer's disease and then discusses their implications for research and for prevention.

## Biological Risk Factors

### *Genetic Vulnerability*

Over the past decade, evidence that genetic factors play a ma in vulnerability to AD has accumulated. In a distinct minority o AD begins early, in the fourth or fifth decade, rather than th typical onset after age 70 or 75. This early onset, "presenile" for clusters in families in a pattern consistent with inheritance of a gene of major effect. (The pattern is most consistent with "aut dominant" inheritance, whereby 50 percent of the children affected parent are expected to inherit such a gene and devel disease.) Breitner and colleagues have raised the question whet absence of a familial pattern in the senile form of AD may be an of "bias of ascertainment" (Breitner, Folstein, and Murphy, Breitner, Murphy, and Folstein, 1986b). Because many first- relatives may have died of other causes before living through the of risk, their loss leads to underestimates of the number who a carry the gene. Using AD patients identified in nursing homes, B and colleagues attempted to estimate the true prevalence amon degree relatives (siblings and children) by taking a careful family in a subpopulation marked by language disorders. If family histo ruled out only for cases in which both parents lived to at least they found that the risk for AD in first-degree relatives of AD p approached 50 percent, consistent with autosomal dominant tance, even in cases of late onset (Breitner et al., 1986a; Breitner 1986b). European case-control studies, however, showed that al family history was an important risk factor, it did not account cases (van Duijn, Clayton, Chandra, Fratiglioni, Graves, Heyman 1991).

It is clear that there are several genetic forms of AD, but it is als that there are cases of "sporadic" AD that are not inherited. The r prevalence of genetic and sporadic forms is subject to consi debate among investigators. Investigators have turned to geneti ies, not only to identify the molecular events underlying AD, but ascertain the importance of environmental factors more precisel

*Twin Studies.* Twin studies could theoretically be particularly us sorting among genetic and nongenetic contributions to the gen AD (Murphy and Breitner, 1992). One case report describes id twins, only one of whom developed AD over a 20-year follow-up (Renvoize, Mindham, Stewart, McDonald, and Wallace, 1986). Th

of apparent twin discordance must be interpreted with some caution, however, as previous reports of discordance have proved to be premature. In one pair of identical twins initially reported as discordant, the second twin developed AD 13 to 15 years after her twin sister (Cook, Schneck, and Clark, 1981). AD in both twins could be a mere coincidence, or it could reflect factors that caused the age of onset to differ by more than a decade despite a genetic predisposition to AD. In surveys of twin studies, the age of onset may differ by as much as a decade between identical twins (Li, Silverman, and Mohs, 1991; Breitner, Murphy, Folstein, and Magruder-Habib, 1990; Nee, Eldridge, Sunderland, Thomas, Katz, Thompson et al., 1987). Because identical twins share their genes, if both do not develop AD, this is strong evidence of nongenetic factors.

At the very least, when the age of onset is different for a pair of identical twins, it indicates that environmental factors influence when symptoms begin, suggesting that prevention might work by delaying onset. In one twin study, for example, investigators found that symptoms of dementia began later among female than male twin pairs, an intriguing finding that merits further inquiry (Nee et al., 1987). The differing ages of onset between a pair of identical twins imply that even genetic factors underlying AD may be malleable to environmental interventions. Breitner notes that delaying onset of AD by only five years would reduce its clinical impact by half, because onset is typically delayed until late in life (Breitner, 1991). If the disease began five years later, many individuals would die before showing symptoms. Finding strategies to delay onset is thus a primary focus of epidemiological and other biomedical research.

Twin studies to date have been hampered by a bias, because the twins studied are likely to have volunteered. A more reliable population-based study that should not suffer from this flaw is under way, using a twin registry of U.S. veterans. This data set includes a heavy predominance of males, and clinical data are incomplete. This study cannot verify the preliminary finding that age of onset differs between the sexes, but its analysis should nonetheless illuminate the importance of many other nongenetic factors among identical and fraternal twins (Breitner, Welsh, Magruder-Habib, Churchill, Robinette, Folstein et al., 1990).

*Studies of Down's Syndrome.* Down's syndrome (DS), the most common genetically identified cause of mental retardation, has provided another line of evidence supporting genetic factors in the risk for AD (Coyle, Oster-Granite, and Gearhart, 1986). DS, or trisomy 21, results from having three copies, instead of the normal two, of all or part of

chromosome 21, especially the distal end of its long arm. Thus not result from "mutant genes" but rather from the alter expression from an abnormal gene copy number. Post mortem indicate that virtually all DS individuals develop the neuropath AD by the time they reach their fourth decade. The distribu density of the pathological stigmata in DS brains are indisting from AD. Furthermore, the DS brains with AD exhibit the same vulnerability of nerve cell populations. Nevertheless, some c individuals do not exhibit the cognitive deterioration expecte basis of the microscopic findings in brain tissue, and thus do r the standard criteria for "dementia," which by definition entai tive decline.

*Molecular Studies of Amyloid.* Recent molecular biological stud begun to shed light on the cellular processes leading to AD path focusing upon amyloid (Mueller-Hill and Beyreuther, 1989). An the senile plaque is an obvious target for analysis, because the d senile plaques correlates both with cognitive impairment a biochemical deficits in AD. Amyloid has been purified to hom from the brains of individuals with AD or DS/AD, demonstratin is a peptide of approximately 42 amino acids. From the seq amino acids in amyloid, it is possible through molecular b methods to clone the gene that contains the amyloid sequenc studies demonstrate that amyloid is a breakdown by-product o larger protein (designated amyloid precursor protein, or APP normally expressed on the surface of many cells in the bo especially nerve cells in the brain's cerebral cortex. The gene e the APP protein is located on the long arm of chromosome 21 an processed inside cells into at least four proteins of varying len

A critical question concerns the mechanisms that favor a bre pathway for APP that generates amyloid (Hardy and Higgins, the case of DS, the three copies of the APP gene, due to its pre chromosome 21, could result in a marked overexpression of brain. As a consequence, amyloid might accumulate in the much more rapidly than normal. In AD, an aberrant enzy degrades or modifies APP and its metabolites could play a ro are many possible explanations for how amyloid deposition i disease, and this will be a main target for AD research in comi

Preclinical studies suggest that aberrant addition of phosphat to the APP protein favors a metabolic route that generates instead of protein cleavage. One strategy for prevention fo delaying the degradation of APP. If amyloid accumulation is

ıse of cell death, then slowing its accumulation could delay this, and
sumably also the onset of clinical dementia.

*ıetic Mutations.* An obvious possible cause of abnormal disposition
APP is an alteration of the DNA constituting its gene—a mutation.
leed, several families with autosomal dominant forms of presenile
) have been shown to have just such a mutation, localized to a specific
sition (codon 717) of the APP gene (Goate, Chartier-Harlin, Mullan,
)wn, Crawford, Fidani et al., 1991). In other cases, a different
ıtation, at codon 670/671, has been found in the same gene, again
ociated with AD (Mullan, Crawford, Axelman, Houlden, Lilius,
nblad, and Lannfelt, 1992). Another mutation complex, affecting
lons 713 and 715, was found in a 64-year-old woman with AD, but
) in her 88-year-old mother and four siblings, all of whom were older
n 62 and clinically unaffected (Carter, Desmarais, Bellis, Campion,
rget-Darpoux, Brice et al., 1992). The significance of this double
ıtation is thus unclear, and it may represent a mere coincidence.
ıtations in the APP account for only a very small percentage of
ly-onset familial AD cases, although they strongly suggest that the
P gene can be functionally related to AD in these few cases. This
ms likely to prove but the first of many molecular aberrations that can
d to AD.

*ıetic Heterogeneity.* There appear to be multiple genes that can cause
) in different families. The first report of linkage between AD and DNA
rkers appeared in 1987, implicating a region on chromosome 21, and
s later confirmed by other groups (St. George-Hyslop, Haines, Farrer,
insky, Van Broeckhoven and Goate, 1990; St. George-Hyslop, Tanzi,
insky, Haines, Nee, Watkins et al., 1987). In addition to the very small
ction of familial cases associated with a mutation of the gene encoding
APP protein on chromosome 21 (Schellenberg, Anderson, O'dahl,
sjman, Sadovnick, Ball et al., 1991), there is also evidence of a gene
ewhere on the same chromosome (Goate, Haynes, Owen, Farrall,
ıes, Lai et al., 1989; St. George-Hyslop et al., 1987). Most of the
dence for another chromosome 21 gene, however, comes from a large
ian family that shows even stronger evidence of a gene on chromosome
A second chromosome 21 AD gene, in addition to the APP gene, is
ıs possible but by no means certain. A second gene on chromosome 21
also modify the action of the APP gene or another gene, and hence
)w genetic linkage.

was already clear in 1988 that the molecular defect among several
ferent families with an inherited form of AD resided on sites other

than chromosome 21 (Schellenberg, Bird, Wijsman, Moore, Boe Bryant et al., 1988). Since that time, evidence has accumulat another possible gene on chromosome 19 in a few families (C Saunders, Strittmater, Schmechel, Gaskell, Small et al., 1993; P Vance, Bebout, Gaskell, Yamaoka, Hung, Alberts, and Walker, and a more common gene defect, perhaps accounting for most fa with early onset, on chromosome 14 (Mullan, Houlden, Windels Fidani, Lombardi, Diaz et al., 1992; St. George-Hyslop, H Rogaev, Mortilla, Vaula, Pericak-Vance et al., 1992; Van Broeckl Backhovens, Cruts, DeWinter, Bruyland, Cras, and Martin, 19 few large families, called the Volga Germans for their common p of ethnic migration from Germany to Russia and thence to the States early in this century, also have an inherited form of AD. Volga German families, the inheritance pattern is not consisten any of the chromosomal locations associated with other fa This suggests one or more as yet undiscovered genes associate AD or a mixture of genes on different chromosomes in the family.

*Continuing Investigation.* Viewed in aggregate, these studies in that AD is a common disorder with genetic heterogeneity, meani several genetic defects can cause a clinically and neuropatholo similar syndrome. AD can result from mutation in the APP gen possibly follow from overexpression of APP due to gene tripl (DS), and clearly can also be caused by mutations elsewhere human genome. AD may develop from one or more genes on ch some 21 (the APP gene and perhaps one other), a gene on chrom 14, perhaps another on chromosome 19, and one or more genes the Volga German families. Because of the complexity of APP m lism, there is reason to expect that mutations of genes encod enzymes that process amyloid protein could cause an accelerated accumulation of amyloid, leading to AD. The clinical and patho features of AD may also appear in response to entirely di biochemical defects not yet discovered. Those studying familial fo AD hope to identify and isolate specific gene defects, which wou to the protein those genes encode, and to possible clues about the of Alzheimer's disease.

The common conception that genetic disorders are resistant to vention has proved untrue in many disorders. There are dietary ments for phenylketonuria, and many genetic disorders requ environmental trigger. Twin studies, genetic linkage studie searches for specific genes not only provide logical paths for sc

stigation toward a causal explanation of AD, but also may provide
s for prevention, depending on what the genes do. Genetic studies
late have solidly established the role of genetic factors, but the
lications for prevention are not yet clear.

### *tory of Head Trauma*

history of head trauma has appeared as a risk factor for AD in
eral epidemiological studies (Henderson, Jorm, Korten, Creasey,
Cusker, Broe et al., 1992; Mortimer, van Duijn, Chandra, Fratiglioni,
ves, Heyman et al., 1991; Graves, White, Koepsell, Reifler, van Belle,
on, and Raskind, 1990; Amaducci, Fratiglioni, Rocca, Fieschi,
ea, Pedone et al., 1986; French, Schuman, Mortimer, Hutton,
man, and Christians, 1985; Mortimer, French, Hutton, and Schu-
, 1985; Heyman, Wilkinson, Stafford, Helms, Sigmon, and Wein-
, 1984). Recent studies show correlations with nonfamilial cases of
rather than familial cases (Henderson et al., 1992; Mortimer et al.,
), suggesting it is an independent risk factor and may or may not
ribute to dementia through an entirely different causal pathway
n that of the genetic forms. These studies have rekindled interest in
a as a cause of AD.

clinical syndrome, *dementia pugilistica*, has long been described in
clinical literature (Mendez, 1993). Microscopic plaques and tangles
ound at autopsy, but they are distributed more widely than in
cal AD. Dementia pugilistica is most likely to occur among those
sustain repeated closed head injuries, especially boxers. Dementia
cally begins several years after exposure to trauma. It is most
on among those with a history of vascular disease, alcoholism, or
IQ (Mendez, 1993). Recent studies show a correlation between
re head injury and presence of plaques, which appear in one of
e individuals subjected to repeated head trauma such as boxing
nton, Ambler, and Roberts, 1991; Roberts, Allsop, and Bruton,
).

evention of head trauma is itself a laudable goal. Head trauma can
duced by use of seat belts and air bags in automobiles, wearing
nets while riding motorcycles or bicycles, and reducing exposure to
nts likely to result in trauma (e.g., boxing), and other measures. The
nediate benefits include reduced risk of spinal cord injury and acute
n injury. Trauma, including head trauma, is a major cause of
nature mortality, especially among young adults. Preventing AD
eral years hence may be but an additional, delayed, benefit from
sures commendable in their own right. The association between

repeated head trauma and dementia suggests that the sport of boxing carries a significant long-term risk.

### *Medical Risk Factors, Including Thyroid Disorders*

Several other risk factors have been identified by one or more epidemiological studies. However, a recent study concluded that despite enormous efforts to gather clinical data on a large number of subjects, "we have been unable to identify any important candidate [medical] risk factors that may account for a substantial proportion of the cases of AD occurring in the community" (Kokmen, Beard, Chandra, Offord, Schoenberg, and Ballard, 1991). But there may be one exception. A recent review of several studies corroborated previous reports of an association with thyroid disorders (Breteler, van Duijn, Chandra, Fratiglioni, Graves, Heyman et al., 1991; Treves, 1991), although the effect was much smaller than that of family history or head trauma.

### *Maternal Age at Time of Birth*

An even weaker association was found between AD and maternal age at time of birth, with AD prevalence increased among those born to either unusually young or unusually old mothers (Rocca, van Duijn, Chandra, Fratiglioni, Graves, Heyman et al., 1991). These preliminary results suggest future research directions.

## Psychosocial Risk and Protective Factors

### *Educational Level*

Several studies have shown a higher prevalence of dementia among those with less education, although findings are not entirely consistent from study to study. Projections of AD prevalence in the United States in 2050 yield estimates of 10.3 million cases of probable AD if the trend to increased education in the U.S. population is taken into account, but 15.4 million without this adjustment factor for education (Evans, Scherr, Cook, Albert, Funkenstein, Smith et al., 1990). Studies in Italy and China show more dementia among the less educated (Rocca, Bonaiuto, Lippi, Luciani, Turtu, Cavarzeran et al., 1990; Zhang, Katzman, Salmon, Jin, Cai, Wang et al., 1990; Amaducci et al., 1986), similar to previous North American and European studies. One recent community survey in Baltimore, Maryland, however, found the opposite effect, with higher AD prevalence among the more educated (Folstein, Bassett, Anthony,

Romanoski, and Nestadt, 1991). This effect was relatively weak and depended on a small number of cases in the higher-educated categories, and thus should be interpreted with some caution.

Katzman (1993) recently reviewed the literature on education and Alzheimer's disease, observing that several epidemiological criteria of causality have been met, but he still urges caution in interpreting results. He concluded that if education has the effect of increasing synaptic density in some brain regions, and if it is indeed loss of cells in these regions that predisposes to clinical dementia, then the epidemiological and biological data could be integrated into a plausible theory. The effect of education would not be to alter the underlying biological cause of cell loss, but rather to delay its clinically detectable effects, so that dementia does not ensue for an additional five or so years.

### *Smoking*

Epidemiological case-control studies looking for associations between AD and smoking over the past decade have produced conflicting results. Graves and colleagues recently reported a meta-analysis of data from eight of these studies, which individually had reached different conclusions (Graves, van Duijn, Chandra, Fratiglioni, Heyman, Jorm et al., 1991). The reanalysis of pooled data disclosed a statistically significant inverse correlation between smoking and AD prevalence—that is, those who smoked more were less likely to have AD. The analysis included one study that had found a positive correlation (higher prevalence of AD among smokers), but the population in this study was unusual and even when cases from this study were included, the meta-analysis reached the same conclusion of an inverse correlation.

An association between reduced AD prevalence and smoking is an intriguing lead. It has some biological plausibility because nicotine, an active agent in tobacco products, binds to the acetylcholine receptors, whose loss is associated with AD. It is thus not unreasonable to postulate that smoking might delay onset of symptoms. Against this, however, the studies did not show a later onset in smoking than nonsmoking cases of AD, although one of the component studies from the Netherlands did find that when two or more family members developed AD, one of whom smoked and the others not, the onset was later for the smokers. This was based on a very small number of cases and is thus only a tantalizing but uncorroborated finding. The authors of the meta-analysis urge caution in interpreting the findings, as there are many possible confounding factors that could be controlled only by prospective longitudinal population-based studies, rather than case-

control studies. Pursuing an AD-tobacco association is clearly a high priority in AD risk research.

### *Environmental Triggers*

Alzheimer's disease exemplifies how basic biomedical research can address a complex disorder of unknown cause. For the most part, investigators have based molecular inquiry on clues derived from what is known about the pathology of AD, for example, the composition of plaques and tangles, or what is known about clinically similar disorders such as Parkinson's disease or Creutzfeldt-Jakob disease (CJD). CJD is a very rare dementia caused by an atypical transmissible agent (sometimes called a slow virus). Limited evidence suggests that some cases of AD may also be related to a transmissible agent (Manuelidis and Manuelidis, 1991). Following a different line of research, several reports of association with aluminum toxicity drew attention in the 1970s and 1980s, but a more recent study with a highly sensitive method suggests that findings in previous reports may have been laboratory artifacts (Landsberg, McDonald, and Watt, 1992). The high aluminum concentrations may have been due to the affinity of plaques and tangles for aluminum introduced during laboratory analysis, after the tissue was removed from the body, rather than the aluminum causing cell death.

If viruses or environmental toxins prove to be important in the causation of AD, then prevention measures would obviously follow. The evidence for these hypothetical environmental triggers, however, is not currently strong enough to warrant aggressive preventive measures.

## Future Directions in Identification of Risk and Protective Factors

In a recent minireview, Drachman and Lippa (1991) listed 17 different causal hypotheses for AD, and each has been pursued by one or more research groups. Biomedical research on AD has flourished over the past decade. The federal research budget has risen from $3.9 million in 1976 (OTA, 1987) to an estimated $297 million in 1993 (DHHS, 1993). This profusion of funding has led to a dramatic rise in annual publications. A literature search for 1980 found 113 AD publications, whereas a similar search covering a 42-month period from 1989 to 1992, done as background for this report, found 4,189—almost 100 per month, and a more than tenfold increase in publication rate during the 1980s. Future research will entail a complex interplay among further biomedical research studies pursuing specific causal hypotheses, more refined epidemiological investigations to tease apart risk factors, and health

vices research aimed at improving services for those who develop

leterogeneity of cause is one highly plausible explanation for the nsistency among epidemiological studies and the weak predictive ver among those risk factors analyzed to date. Future studies may e successfully dissect out risk factors by segregating disease sub-es, perhaps through identifying genetic subgroups (those showing age to different chromosome regions, for example), or by separately lyzing cases arising from currently known risk factors such as head ma or level of education.

rugs to reverse the cognitive impairments of AD have been pursued rously for the past decade. One main line of attack has focused on s to sustain the action of the neurotransmitter acetylcholine. Farlow colleagues recently conducted the largest clinical trial of the drug ine to date and reported that it measurably improved cognitive ction in just over half the subjects, roughly equivalent to a six-month ay in the course of the disease (Farlow, Gracon, Hershey, Lewis, owsky, and Dolan-Ureno, 1992). An editorial accompanying Far-'s publication suggested that the drug might prove clinically useful a subset of patients who do not develop liver toxicity and are fully monitored (Small, 1992). Drugs to address the loss of neuronal tems, using peptide transmitters, growth factors, and other possible roaches, remain of intense interest, but most are early in develop-nt and are being tested in exploratory clinical trials.

lopes for prevention are pinned to understanding the biology of ve cell death. Why do certain cells die? The discovery of hormones growth factors that stimulate cell growth suggests that their absence y lead to cell death. Examples of genetically programmed cell death ematode worms and other organisms also offer clues to possible sons for the death of nerve cells. For the most part, these hypotheses e suggested lines for further research that may eventually suggest vention strategies, but none is sufficiently advanced to merit even a vention trial.

dvances in understanding how amyloid is deposited offer several tegies for intervening in the process (Katzman and Saitoh, 1991). ention has turned recently to the development of drugs that could v the formation of amyloid from APP or enhance the clearance of yloid. Prophylactic administration of such drugs might be effective in ving progression for patients in the early stages of AD or in venting the onset of AD in individuals genetically at risk. Such rmacological prevention is analogous to the use of cholesterol-ering drugs in atherosclerosis, and the development of such drugs

will be aided greatly by molecular biological studies to identify gene mutations that lead to AD vulnerability. Thus identification of these genes will permit gene-based diagnosis of AD vulnerability as well as lead to an understanding of the role of the mutant gene products in causing AD. Together, these current lines of investigation hold promise for the development of specific, pharmacological preventive interventions for those at genetic risk for AD.

## Family Burden

The widely documented stress experienced by relatives caring for elderly, demented persons exacts a heavy toll. Several studies have sought to measure this impact on families, including the adverse effects on the caregiver's physical and mental health (George and Gwyther, 1986; Pratt, Schmall, and Wright, 1985). One of the determinants of distress in caregivers is depletion of their social support network, leaving them feeling abandoned, isolated, and without assistance and recognition. The Office of Technology Assessment noted a surprising lack of correlation between a patient's characteristics and behaviors and the caregiver's subjective experience of burden, although it is clear that coping skills and education can reduce that subjective experience (OTA, 1990). Caregivers differ markedly, as do the patients and the availability of support services. It is simplistic to assume that caregivers will respond consistently to any given intervention, but it is reasonable to assume that the availability of information and support services will reduce the stress and stress-related health effects among caregivers. Preventive intervention strategies for these high-risk family members—no matter what the nature of the prevailing mental disorder—therefore might include methods already in use, but inadequately evaluated, such as self-help support groups and psychoeducational programs (Falloon, Boyd, McGill, Razani, Moss, Gilderman, and Simpson, 1985; Bernheim, Lewine, and Beale, 1982; Vine, 1982). In addition to formal services, caregivers appear to benefit from group support, information, and the availability of someone they trust to answer questions when they need help (K. Maslow, personal communication, 1992; OTA, 1990). An improved care system may prevent the new incidence of stress-related disorders among caregivers. Better management of patients—particularly with regard to the troublesome behavioral symptoms of agitation, wandering, insomnia, and emotional outbursts—might also have positive effects for caregivers, although clinical literature to support this common-sense conclusion is surprisingly scant despite the intense assessment of family burden in recent years. This is a critical gap in research.

he study of care-related disability among caregivers continues to be mportant area for research. The first wave of studies over the past ade has served mainly to describe differences among patients, givers, and the service system. This information is now laying the e for a second wave of more refined caregiver burden studies with re precise outcome measures, interventions, and service availability sures.

### Findings and Leads

t this time, there is no research base sufficient to mount a preventive rvention campaign with potential AD victims. Research must con- e to be focused on identification of risk factors, through research on etics, continued basic research, and further epidemiological studies. ust also begin to identify the relative and attributable risks associ- l with each of these factors. The best hope for prevention in the near re lies in the research focused on delaying the onset of AD, either ough education early in life or through the prophylactic use of drugs prove cognitive function or to impede amyloid deposition in n-risk individuals. Although effective prevention often does not uire a complete causal theory, it does require more robust risk and ective factor studies than exist for AD. The literature to date has ed three malleable factors—education, smoking, and head trauma— are plausibly associated with AD. In all three cases, the reasons to nge behavior are even stronger for other purposes than prevention dementia. Reducing head trauma and promoting education are lable social goals that may reduce future AD prevalence. Promoting oking as a protective factor for AD is absurd given tobacco's serious th risks for cancer and heart disease. A more targeted prevention tegy depends either on discoveries that come from basic research or nger epidemiological evidence of malleable risk factors than has n discovered to date. On the other hand, research trials on interven- s to prevent stress-induced effects among caregivers of AD patients warranted. Such studies will require rigorous methodology, includ- valid outcome measures.

## SCHIZOPHRENIA

chizophrenia is a heterogeneous disorder with different disease ties, subtypes, and pathological processes. Therefore the risk and ective factors associated with onset may be different for the various dromes included within the disorder. Risk factors may bear different

relationships to the three main domains of the psychopath psychosis as defined by hallucinations and delusions, dis thought processes, and primary negative symptoms such as e flatness. They may also have different patterns of heritability. other hand, they may be seriously confounded.

## Biological Risk Factors

### *Genetic Vulnerability*

*Family Studies.* The most prominent biological risk factor is although some legitimate controversy exists. Although there spread acceptance that genetic factors contribute to schizophre studies have questioned whether narrowly diagnosed schizophr familial disorder (Abrams and Taylor, 1983; Pope, Jones, Coh Lipinski, 1982), claiming that earlier studies suffered from a controls, bias in diagnoses, and inconsistent diagnostic criteria 1980s, five careful studies reported a greater than fivefold increa in first-degree relatives (Kendler, Masterson, and Davis, 198 stered by more recent studies, this suggests genetic and/or environmental factors in families that increase the risk of schizo (see Box 6.1). On the other hand, absence of a positive family does not ensure freedom from risk. Positive family histor probabilities, but it is still not sufficiently clarifying except identical twins, who actually share the same genetic material.

*Twin Studies.* An estimate of genetic influence can be establi using twin studies. The genetic contribution can be estim comparing concordance rates between monozygotic (identi dizygotic (fraternal) twin pairs. Kendler (1988) summarized 11 and derived a monozygotic mean concordance rate of 64 perce dizygotic mean concordance rate of 16 percent. This suggests role for genetic factors, although the estimate may seem high ir the other, nontwin data. The fact that 36 percent of identical tw discordant also clearly demonstrates the importance of no factors. Methodological issues include the assumption that mon and dizygotic twins have an identical trait-relevant environmen possibility of selection bias in the recruitment of monozygoti Such criticisms are not supported by adoption studies. Twin have been updated (Gottesman, 1993), and there is now evide the risk to offspring of discordant monozygotic twins is ren similar. That is, the children of an unaffected identical twin hav

## BOX 6.1
## Children of Parents with Schizophrenia: Family History as a Risk Factor

The proportion of individuals with schizophrenia who marry is less than in the general population (25 to 47 percent for males and 39 to 82 percent for females), but the rate of reproduction among them has been increasing (from 58 percent of the general population rate in the 1930s to 70 percent in the 1960s), perhaps due to improvement in treatment (Erlenmeyer-Kimling et al., 1980) and to the remarkable diminution in the pattern of prolonged segregation by gender encountered during the era of long-term custodial care in public facilities.

The children of parents with schizophrenia are a high-risk group. First of all, they have an increased genetic vulnerability for schizophrenia. Second, their other parent is likely to have a mental disorder. The prevalence of assortative mating (i.e., the tendency of people to select as mates people with the same or similar characteristics) in schizophrenia has yet to be determined rigorously, but the best available data suggest it may be high. Rosenthal (1974) found that 58 percent of spouses of schizophrenic subjects themselves had a schizophrenic spectrum disorder. Fowler and Tsuang (1975), in a blind comparative study, found that 39 percent of spouses were psychiatrically disturbed, with alcoholism and personality disorders accounting for 70 percent of the problems. These additional disorders could have an additive effect on the genetic and/or psychosocial risk for the child. Third, capabilities of the schizophrenic parent to care adequately for the child may be adversely affected by the disorder, especially if the disorder is chronic and severe (Grunbaum and Gammeltoft, 1993).

Cohorts of children with at least one schizophrenic parent have been studied with a view toward understanding the premorbid state of this disorder and isolating factors that may either contribute to the onset of schizophrenia or serve as markers of children at high risk to express schizophrenia. Mednick and Silverton (1988) reviewed 22 studies in the literature and pointed out that the major logistical problem is the long time period between beginning to study the children and having them complete the risk period for developing the disorder.

Szatmari and Nagy (1990) reviewed the literature on children with schizophrenic parents and concluded that between 20 and 40 percent develop a mental disorder during their childhood, a rate that is very similar to that in children of parents with other mental disorders (Rutter and Quinton, 1984). Rarely, however, do these children develop childhood schizophrenia. Their adult outcome may be more influenced by genetic factors related to schizophrenia. Children who have two schizophrenic parents are at especially high risk (46 percent lifetime) for developing schizophrenia (Gottesman, 1991), but they are also at considerable risk for developing other mental disorders.

the same risk as the children of the affected twin. The risk i offspring of schizophrenic identical twins is 16.8 percent; it is percent in the unaffected twins' offspring (Gottesman and Berte 1989). This evidence that inheritance can "pass through" appar asymptomatic, unaffected individuals suggests a strong genetic co nent but again clearly indicates that nongenetic factors are also invo

*Adoption Studies.* Two strategies have been used to estimate ge effects in adoptive families. One approach is to evaluate offspri schizophrenic parents who have been adopted away from their bi ical parents into another environment and measure the rates at w such children develop schizophrenia. The second approach is to s the rearing, adoptive families of adopted children who have devel schizophrenia as adults. Heston (1966) studied adopted-away offs of schizophrenic mothers and found a significant rate of schizoph in these children (10.4 percent prevalence, which became 16.6 necessary age corrections were made), compared with children unaffected mothers (no children with schizophrenia). A stud Rosenthal (1974) showed a similar result (13.9 percent from biolog affected families and 3.4 percent of controls), but the data did achieve statistical significance. In a much larger Finnish study (Ti 1991a,b,c), 10.3 percent of schizophrenic women's children also be schizophrenic, even when raised by adoptive families, confir Heston's results. Kety and co-workers, on the other hand, began study with adoptees who grew up to be schizophrenic (Kety, Rosen Wender, Schulsinger, and Jacobsen, 1978). The adoptees' adoptiv biological families were located and evaluated. Both schizophreni the schizophrenic spectrum disorders were significantly higher i biological relatives than in the adoptive families. These results been subject to extensive reanalysis, including careful diagnostic re uations (Kendler and Gruenberg, 1984). Taken as a body of work, studies collectively indicate that the offspring of schizophrenic ind uals have a greatly increased risk of developing schizophrenia and schizophrenics do not transmit this vulnerability to their nonbiol families. This evidence points to a strong role for genetics as a factor. The genetic data also make clear that nongenetic factors, su environmental influences and acquired brain damage, must have in accounting for the incidence of the disease (Gottesman and Berte 1989).

*Linkage Studies.* Linkage studies in schizophrenia using conven markers and assuming a single major locus have been inconclu

n the development of polymorphic DNA markers, careful studies
pecific candidate genes such as the D2 receptor (Moises, Geler-
r, Giuffra, Zarcone, Wetterberg, Civelli et al., 1991) and various
ons of chromosomes 2, 5, 11, 12, and 22 have been examined. No
oducible linkage or association has been found (Waddington,
er, Crow, and Hirsch, 1992). There are several possible reasons
he lack of progress in spite of the rapid increase in the power of
ecular genetics. The limits of the mathematical models used to
ulate the probability of linkage between a gene and the disorder
n that only one or two gene models are usually considered, and
nt evidence suggests that this disorder is polygenic, involving
ral genes (Carter and Chung, 1980). If this is true, then linkage
ies, at least of the type that have been undertaken so far, are of
ed value. In addition, heterogeneity in the diagnosis of schizophre-
is probable, and this makes linkage studies considerably more
cult. The report of a linkage in Icelandic and British families by
rington and colleagues (Sherrington, Brynjolfsson, Petursson, Pot-
Dudleston, Barraclough et al., 1988) had been thought to represent
e of heterogeneity because this linkage has not been reproduced in
studies (St. Clair, Blackwood, Muir, Bailie, Hubbard, Wright, and
s, 1989; Kennedy, Giuffra, Moises, Cavalli-Sforza, Pakstis, Kidd et
988; Detera-Wadleigh, Berrettini, Goldin, Boorman, Anderson, and
hon, 1987). However, the Sherrington linkage has not held up with
ddition of more informative markers.

### *nancy and Birth Complications, Winter Births, and Viral Exposure*

recent study by Bracha and colleagues provides new evidence that
nd prenatal trimester insult may be associated with the expression
chizophrenia (Bracha, Torrey, Gottesman, Bigelow, and Cunniff,
. These researchers found that monozygotic twins discordant for
zophrenia had more differences in their fingerprints than normal
s. This finding suggests that disturbances occurred in the devel-
ent of one of the fetuses that may be related to the fact that only
twin expressed his or her genetic predisposition toward schizo-
nia.

a variety of studies carried out with adult schizophrenics in the
d States and Europe, an excess of obstetrical complications in the
ners of subjects who later became schizophrenic compared with
rol groups has been documented (McNeil, 1987). These complica-
s appear to be related to infant anoxia during birth. Birth complica-
s also appear to be associated with larger cerebral ventricles and may

be negatively associated with a strong genetic history of schizophre in the family (Canon, Mednick, and Parnas, 1989). Thus individu whose schizophrenia arises from brain trauma during birth may have a genetic form of the illness. Such individuals are "phenocopie because they have an illness that resembles one caused by gen factors, but which arises from a nongenetic cause or in interaction w a subset of such factors. However, caution must be exercised in us birth complications as a risk factor to target in preventive interventio A positive history for birth complications does not indicate whether individual has suffered an insult to central nervous system developm that is associated with the onset of schizophrenia, and a negative hist for gestational and birth complications gives no assurance of t absence. It is also possible that genes associated with schizophre could cause gestational or birth complications. Finally, a recent, hi quality study by Done and colleagues had inconclusive results regard birth trauma as a risk factor for the onset of schizophrenia (Do Johnstone, Frith, Golding, Shepard, and Crow, 1991).

It has been suggested that there is an excess of winter births amo schizophrenic patients (Dalen, 1988), but overall results of season- birth studies are highly inconsistent (Lewis, 1989). It has also b suggested that winter births of schizophrenics are related to mater exposure to influenza. Barr, Mednick, and Munk-Jorgenson (19 studied births in Finnish mothers exposed to the influenza epidemi 1957 and found an increase in schizophrenic offspring among t cohort of births. However, population data from Scotland, Engla and Wales failed to replicate this finding (O'Callaghan, Sham, Tal Glover, and Murray, 1991; Kendell and Kemp, 1989). Furthermo winter birth does not fit the viral hypothesis, which holds t maternal viral infection in the second trimester of pregnancy is rela to higher rates of schizophrenia. If this were true, and if flu is m common in the winter months of January, February, and March, th children born in the spring should have higher rates of schizophren To the degree that maternal or gestational viral infection might resul damage to the fetus's brain, these viruses could contribute to development of schizophrenia, but there is no conclusive evidence this, and at this time viral exposure cannot be considered a documen risk factor. Winter birth may be a risk factor, but season of birth does provide evidence that any given individual will develop schizophren Most winter-born schizophrenics presumably get schizophrenia for same reason as nonwinter-born, and at this point it is impossible determine which of the small minority have some other special r associated with winter birth.

### *Biological Markers*

The major biological markers under consideration to identify high-risk populations of children include (1) smooth pursuit eye tracking deficits (Holzman, Solomon, Levin, and Waternaux, 1984); (2) attentional deficits (Garmezy, 1978); (3) neurointegrative defects (Erlenmeyer-Kimling, Cornblatt, Freidman, Rutschmann, Simmons, and Devi, 1982); (4) electrodermal hyperresponsivity (Mednick and Schulsinger, 1968); and (5) increased cerebral ventricular size (DeLisi, Goldin, Hanovit, Maxwell, Kurtz, and Gershon, 1986). Like all risk factors, these markers do not necessarily mean that the disorder is or will be expressed. Although they may be apparent in high-risk children and some have been shown to be present in a high proportion of children who go on to develop schizophrenia (Erlenmeyer-Kimling, Rock, Squires-Wheeler, Roberts, and Yang, 1991; Erlenmeyer-Kimling et al., 1982), their presence does not necessarily predict the development of the disorder. Moreover, none of the markers have clearly established themselves as linked with a genetic vulnerability for schizophrenia, although a few remain viable candidates. (See the review by Hafner and Gattez, 1991.)

*Smooth Pursuit Eye Tracking Deficits.* One of the most investigated markers for schizophrenia is deviant smooth pursuit eye movements (Grove, Clementz, Iacono, and Katsanis, 1992; Clementz and Sweeney, 1990; Iacono, Bassett, and Jones, 1988; Holzman et al., 1984). When given the task of visually tracking a moving target, most individuals exhibit smooth, coordinated eye movements. Schizophrenics, however, show choppy disruptions in the tracking pattern. Although the nature of the link to schizophrenia is not clear, it has been a consistently replicated finding, and one that has attracted considerable attention. The marker is found in schizophrenics as well as their affected and unaffected family members (Iacono, 1985). This has led to speculation as to whether the marker reflects a genetic vulnerability to schizophrenia. The results, initially described by Holzman and colleagues (Holzman, 1983; Holzman, Proctor, and Hughes, 1973), have been widely replicated and suggest that between 50 and 85 percent of schizophrenic subjects, as well as 40 to 50 percent of their first-degree relatives, may have disrupted smooth pursuit movements, in contrast to a general population prevalence of 5 percent. Unfortunately, deficits in smooth pursuit eye tracking are induced by lithium administration (Levy, Dorus, Shaughnessy, Yasillo, Pandey, Janicak et al., 1985). Thus the weight of evidence suggests the marker is not specific for schizophrenia, but smooth pursuit eye tracking is clearly strongly associated with increased risk and may be a latent trait marker.

*Attentional Deficits.* Attentional deficits have also been suggested as possible markers with a linkage to schizophrenia. These deficits can also occur in other mental disorders, but the disturbance may be more pervasive in schizophrenics. In one study using a combined measure of attention and information processing, Cornblatt and Erlenmeyer-Kimling found that 27 percent of children of schizophrenics had impaired attention and information processing, compared with 11 percent of children from affectively ill parents (Erlenmeyer-Kimling and Cornblatt, 1992; Cornblatt and Erlenmeyer-Kimling, 1985). There are few data thus far on the specificity of the marker for subsequent development of schizophrenia.

Performance on a specific measure of focused and sustained attention, the continuous performance test (CPT), has received considerable attention as a possible marker for schizophrenia. Asarnow and colleagues showed that children of schizophrenic subjects performed significantly worse on this test than children of control subjects (Asarnow, Steffy, MacCrimmon, and Cleghorn, 1977). This finding has been replicated and extended to cohorts of schizophrenic patients. Nuechterlein and colleagues reviewed this work and suggested that because the abnormalities can be seen in actively psychotic patients, patients in relative remission, and children of schizophrenics, the CPT may represent a stable vulnerability marker (Nuechterlein, Dawson, Venture, Fogelson, Gitlin, and Mintz, 1990). Thus the CPT defect may reflect a trait marker with genetic potential, but a genetic analysis of this behavior has not been carried out.

*Neurointegrative Defects.* In infancy and early childhood, neurointegrative defects, including sensorimotor problems, visual motor defects, and soft neurological signs, may be a risk factor for the onset of schizophrenia (Marcus, Hans, Mirsky, and Aubrey, 1987; Mednick, Parnas, and Schulsinger, 1987; Erlenmeyer-Kimling et al., 1982; Marcus, Auerbach, Wilkinson, and Burack, 1981). In a review of nine prospective studies of infants at risk for schizophrenia, Fish and colleagues concluded that there is evidence that a schizophrenic genotype may be manifested in infants by a neurointegrative defect called pandysmaturation (Fish, Marcus, Hans, Auerbach, and Perdue, 1992). (Occurring during the first two years of life, pandysmaturation is the earliest manifestation of an enduring neurointegrative defect.) Again, there is little specificity in these clinical signs. For example, one small adult follow-up study of children with soft neurological signs found an excess of affective disorder, but not schizophrenia (Schaffer, Stokman, O'Connor, Shaffer, Barmack, Hess et al., 1986). Children with neurointegrative signs appear

to be at higher risk for developing schizophrenia only if they have other risk factors for schizophrenia. Marcus and colleagues followed prospectively the offspring of schizophrenic parents and found that the group at highest risk had a schizophrenic parent, showed early neurointegrative deficits, and experienced troubled parenting (Marcus et al., 1987). Those children with schizophrenic parents and neurointegrative deficits who had positive parental experiences did not develop schizophrenia. This finding is of special importance to prevention research; it suggests placing greater attention on the parenting situation of high-risk children.

*Electrodermal Hyperresponsivity.* Electrodermal hyperresponsivity was proposed as a marker for schizophrenia in the Copenhagen high-risk project (Mednick et al., 1987) and was the variable used to choose a population of high-risk children for the Mauritius prevention project (Mednick, Venables, Schulsinger, Dalais, and Van Dusen, 1984). Electrodermal hyperresponsivity was first suggested by Mednick and Schulsinger (1968); subsequently, they suggested it was useful only for males. Subsequent studies suggested there is little evidence of a reproducible association between electrodermal hyperresponsivity and schizophrenia (Erlenmeyer-Kimling, Freidman, Cornblatt, and Jacobsen, 1985; Kugelmass, Marcus, and Schmueli, 1985).

*Increased Cerebral Ventricular Size.* Cerebral ventricular size has been shown to be enlarged in about 30 percent of schizophrenics. Evidence suggests that increased ventricular size is present early in the illness, and the enlargement is stable over time. The specificity of this variable is not clear, however. For example, patients with bipolar mood disorders also have increased ventricular size (Swayze, Andreasen, Alliger, Ehrhardt, and Yuh, 1990). Ventricular size, like many other attributes of bodily structures, is highly heritable. Twin studies have shown a slight increase in ventricular size for the schizophrenic monozygotic twin in twins selected to be discordant for schizophrenia (Revely, Revely, and Murray, 1984).

## Psychosocial Risk Factors

### *Low Socioeconomic Status*

Social status has been assessed in at least 25 epidemiological studies, most of which show heightened prevalence of risk for schizophrenia in the lower class (Eaton, 1974). This association could be the result of adversities and stresses connected to living in a lower social class, or it

could result from downward mobility due to the disease's disability. There is evidence to support the idea that schizophrenia is linked to lower or lessened upward mobility (Turner and Wagenfield, 1967; Goldberg and Morrison, 1963). A study by Dohrenwend and co-workers supports a downward social drift hypothesis, which posits that schizophrenic individuals end up in lower social classes because of their disease-related impairments, rather than developing schizophrenia because of the stress of living in a low social class (Dohrenwend, Levav, Schrout, Schwartz, Naveh, Link et al., 1992). Thus poverty or low social class may be a consequence, rather than a cause, of this disease. There is, however, some highly speculative evidence that one consequence of extreme poverty—acute starvation during the first trimester of pregnancy—may play a role in the onset of schizophrenia, as demonstrated by Susser and Lin (1992) in a study of Dutch births following the famine of the winter of 1944–1945. However, serious but less severe starvation was not associated in one cohort, nor was starvation in the second and third trimester.

### *Disturbed Family Environment and Family Communicative Problems*

An ongoing adoption study in Finland by Tienari (1992, 1991a,b), has given us the first evidence that family problems and communication disturbances within families may play a role in the onset of schizophrenia. This study demonstrates the overexpression of schizophrenia among a cohort of adoptees having biological mothers with the diagnosis of schizophrenia, confirming the role of genetic factors. The study also looks retrospectively at family environment and finds that 9 of the 13 adoptees (of a total of 138 adoptees with schizophrenic biological mothers) who expressed functional psychosis, which includes schizophreniform and delusional disorders, grew up in "severely disturbed" households. When the factors that can be reliably rated from contemporary discourse were examined, it was found that disrupted communication was the major risk factor predicting the onset of psychopathology. The authors have suggested that this supports a notion that genetic factors confer a vulnerability that requires an environmental trigger for the development of the disorder. Aside from a need for replication, the question of the role of a sick child in disrupting communication has not been fully addressed, and it appears that a higher proportion of families with children from schizophrenic mothers had "severe disturbances" than control families.

### *Serious Behavioral and Emotional Problems in Childhood*

One precursor pattern in children who may develop schizophrenia is poor impulse control and aggression. These children have temper

tantrums, are destructive, and receive frequent disciplinary action. This pattern is superimposed on the neurointegrative dysfunctions and attention deficits seen earlier in development. This pattern of behavior in children who would become schizophrenic was reported initially by Bender (1937) and has been confirmed by Emery, Weintraub, and Neale (1982) and Mednick and Schulsinger (1968).

Another precursor pattern is social withdrawal or awkwardness in interpersonal relations, diminished emotional expressiveness, and lack of feeling during childhood and adolescence. These problems define a population at high risk for the initial onset of schizophrenia during young adulthood (W. Carpenter, personal communication, 1993; Erlenmeyer-Kimling and Cornblatt, 1987; Garmezy, 1974; Mednick and Schulsinger, 1968).

Although there is some consistency in these two precursor behaviors exhibited by high-risk children who ultimately develop schizophrenia, there is little specificity. For example, the aggressive symptom pattern is also seen in a variety of other childhood disorders, such as attention deficit hyperactivity disorder, mood disorders, and conduct disorder. However, children who are aggressive *and* have a family history of schizophrenia have an increased likelihood of developing schizophrenia (Mednick and Silverton, 1988), so it may be the combination of risk factors that is most important.

### *Social Dysfunction*

The contribution of social dysfunction, or social incompetence, as a risk factor in the onset of schizophrenia is not well understood. Whereas childhood behavior problems may be an expression of the disorder itself at an early developmental stage, social incompetence may relate to inherited genetic personality patterns, such as schizoid personality. In contrast, the role of social incompetence in the course and outcome of schizophrenia has been well established. For more than three decades, investigators have repeatedly replicated the strong predictive relationship of premorbid level of social incompetence or social maladjustment in areas such as occupation, education, peer friendships, and heterosexual intimacy to course and outcome (Strauss and Carpenter, 1974; Zigler and Phillips, 1961; Garmezy and Rodnick, 1959). The predictive correlations have been significant for a variety of measures of outcome, including symptomatic relapse, rehospitalization, and global ratings of improvement (Kokes, Strauss, and Klormann, 1977; Hersen and Bellack, 1976; Gittelman-Klein and Klein, 1969).

### *Substance Abuse*

Because many substances, such as stimulants and PCP, ca psychotic states that closely mimic schizophrenia, it has bee lated that recurrent drug abuse may lead to an increased developing schizophrenia in vulnerable individuals. Bowe demonstrated that the increase in the proportion of schiz patients admitted to Connecticut state hospitals paralleled a increase in the level of drug abuse in Connecticut. To d whether drug abuse could cause the expression of more sch nia, Bowers examined the family history of substance abus chronic psychosis. The greater the drug abuse, the less famil of schizophrenia was present (Bowers and Swigar, 1983), su that high levels of drug abuse might lead to chronic illness high levels of genetic vulnerability. In a study of first-episod phrenic patients, DeLisi et al. (1986) reported threefold higher drug abuse in patients (35 percent) than in matched po controls (12 percent). Other researchers have also looked at th cannabis, hallucinogenics, and alcohol in the etiology of schiz (Tien and Anthony, 1990; Andreasson, Allebeck, Engstr Rydberg, 1987; Breakey, Goodell, Lorenz, and McHugh, 19 evidence suggests that schizophrenia-like illnesses may be tated by heavy drug abuse. It is possible that these individ precursor symptoms of schizophrenia and were self-medicat these drugs, which then led to an exacerbation of the sympt acute onset of schizophrenia. The existence of uncontrolled v including type and duration of drug abuse, make this a hypo need of rigorous testing.

## Caregiver Burden

Schizophrenia in a family member can become a risk f stress-related disorders in other family members. Many fact caregiver burden, including financial difficulties, self-blame, d severity of the disease, social isolation, the caregiver's own he caregiver's coping skills, and the stigma attached to menta (Geiser, Hoche, and King, 1988; Fadden, Bebbington, and 1987).

The degree to which caregiver burden is linked with the deve of stress-related problems such as depression, irregular slee eating patterns, aggravated health problems, increased use of a tranquilizers, marital strain, and irritability is not well known

studies have found variability in caregivers' ability to cope (Oldridge and Hughes, 1992; Scottish Schizophrenia Research Group, 1985; Gibbons, Horn, Powell, and Gibbons, 1984). Oldridge and Hughes (1992) found that the levels of psychological distress of family members who care for a person with schizophrenia are about twice the level expected in the general population. Further risk studies are needed to determine which family members are most likely to experience these ill effects and what aspects of caregiver burden are the most frequent and the most malleable.

## Findings and Leads

Although genetic vulnerability may predispose to schizophrenia, and may even be necessary in order for the disorder to appear, genetic factors by themselves cannot account for the illness. Many of the data are consistent with a developmental disorder that is set in place via genetic and biological factors early in life. This developmental pattern may be susceptible to psychosocial stress, which may trigger the symptomatic expression of the disorder or which may cross a threshold for disease expression.

For the last decade, research on the causes of schizophrenia has been focused on biological rather than psychosocial risk factors (Yank, Bentley and Hargrove, 1993; Gottesman, 1991). Results regarding the importance of most of these risk factors—both biological and psychosocial—remain equivocal. Only genetic factors have been demonstrated and quantified in repeated and varied experimental designs, but researchers are as yet unable to specify a mode of inheritance, a chromosomal localization of schizophrenia genes, or what function such genes might carry out. Hints with regard to factors that might affect onset, such as prenatal viral infection or food deprivation, are weak and nonspecific. The evidence for familial communicative disorders, neurointegrative defects in infancy, and prenatal developmental disturbance during the second trimester of gestation is preliminary and needs replication, as does the suggestion that substance abuse could play a role in the onset of schizophrenia. More work remains in identifying relative and attributable risk for all these factors.

Universal and selective interventions to prevent the onset of schizophrenia are not warranted at this time. Much more risk factor research is needed, and this must necessarily be limited to narrow populations based on positive ascertainment of risk factors. The best hope for identifying a group of individuals at high risk for the onset of schizophrenia is through the identification of a combination of risk factors whose relative and attributable risks are known.

To date, very few, if any, studies have attempted to carefully both environment and genetics. It is essential to kn genetic and environmental factors interact. This can best through interdisciplinary collaborative research. Some peop field believe that such an understanding will be possible on the genes associated with schizophrenia are characterized. other hand, it may be possible to identify genes of import only is a better understanding of the environment in which they f Even if the gene or genes for subtypes of schizophrenia c found, twin studies indicate that genetic vulnerability alone w account for all the variance; there is a clear opening for ot factors to operate.

The best hope now for prevention of schizophrenia lies with i preventive interventions targeted at individuals manifesting p signs and symptoms who have not yet met full criteria for di The identification of individuals at this early stage, coupled introduction of pharmacological and psychosocial interventio prevent the development of the full-blown disorder.

The children of schizophrenic parents are at increased risk tional problems of many types, including schizophrenia, and pr intervention research should continue to study this high-risk (Early efforts along these lines at the NIMH Prevention Researc have been discontinued.) The parents, spouses, and siblings o phrenic individuals can suffer an immense caregiver burde emotionally and financially, but as yet, little is known about risks within this family group or about the outcome of specific tive interventions provided to them.

## ALCOHOL ABUSE AND DEPENDENCE

Why some people continue to seek alcohol in the face of consequences is not fully understood, and this puzzle m important area of study in alcohol research. The reinforcing pr of alcohol—those properties that produce euphoria—may ex part, why some people begin to drink. Drinking behavior ca explained solely by the direct pharmacological effects of however. Genetic and psychological factors as well as the ment shape drinking behavior. Alcohol abuse and dependen through a complex interaction of biological risk factors, in genetic factors, and psychosocial risk factors, including per features and contextual factors, involving the social environ which an individual lives.

## Biological Risk Factors

### *Genetic Vulnerability*

*Family Studies.* Family studies have clearly shown that alcohol dependence is familial. The evidence for genetic factors for alcohol abuse is less well substantiated (Schuckit, 1994, 1992). About 70 percent of alcoholics have a positive family history of alcoholism in first- or second-degree relatives (M. Schuckit, personal communication, 1993). Sons and daughters of alcoholics have a threefold to fourfold increased risk for developing this disorder (Schuckit, 1986; Cotton, 1979). This suggests that either the environment of an alcoholic family or the genetic contribution from parents influences the development of alcoholism. However, family studies by themselves cannot distinguish nature versus nurture influences on etiology.

*Twin Studies.* The relative contribution of environment and genetics has been examined through twin studies as in the case of Alzheimer's disease and schizophrenia. If a trait has a high heritability, the concordance in monozygotic twins, who share 100 percent of their genes, will be greater than the concordance in dizygotic twins, who share only 50 percent. In general, this is what has been observed in the research (Hrubek and Omenn, 1981; Schuckit, 1981). A study with a small sample of psychiatric inpatients by Murray, Clifford, and Gurling (1983), however, showed no difference between monozygotic and dizygotic concordance using both male and female probands, so although the evidence from twin studies of the importance of genetic factors in the etiology of alcohol abuse and dependence is strong, it is not entirely conclusive.

*Adoption Studies.* Adoption studies are another way to untangle the environmental and genetic contributions leading to the expression of a disease state. Adopted-away sons and daughters from alcoholic families who are raised by nonalcoholic adoptive parents have a significantly increased risk for alcohol abuse and dependence. This risk may be as high as three or fourfold (Goodwin, 1985; Bohman, Sigvardsson, and Cloninger, 1981; Cadoret, 1980; Cadoret and Gath, 1978; Goodwin, Schulsinger, Hermansen, Guze, and Winokur, 1973; Schuckit, Goodwin, and Winokur, 1972).

The data from Bohman, Sigvardsson, and Cloninger's (1981) large Swedish adoption study was used to hypothesize another step in the data analyses (Cloninger, Sigvardsson, Gilligan, von Knorring, Reich, and Bohman, 1989). They have postulated two forms of alcoholism with

considerably different risk factors. The type I alcoholic begins drinking after age 25, infrequently demonstrates spontaneous alcohol-seeking behavior or serious legal problems due to drinking, shows psychological addiction and feels guilt over his or her alcohol use, and demonstrates a rather dependent, sentimental, and introverted personality. The type II alcoholic begins drinking well before age 25, is usually a male, demonstrates alcohol-seeking behavior, and has frequent legal problems due to drinking. These individuals do not show guilt or psychological dependence on alcohol. They demonstrate high novelty seeking and extroverted behavior. The type II alcoholic might have a higher genetic risk than the type I alcoholic.

### *Biological Markers*

Finding potential markers for people susceptible to alcohol abuse and dependence has been the focus of a number of research studies. Biological markers may prove valuable in targeting high-risk populations for prevention trials.

*Electrophysiological Markers.* Event-related potentials, which are electrophysiological brain reactions to stimuli (Porjesz and Begleiter, 1983), have been studied in males with and without a family history of alcoholism. A low $P_3$ amplitude, a measure of one brain wave pattern, has been demonstrated in subjects with increased genetic risk (Begleiter and Porjesz, 1990). It occurs in at least one third of the sons of alcoholic fathers (Hill, Steinhauer, Park, and Zubin, 1990; Noble, 1990; O'Connor, Hesselbrock, Tasman, and DePalma, 1987; Begleiter, Porjesz, Bihari, and Kissin, 1984). Low $P_3$ amplitude has been replicated in other samples, even in alcoholics who are abstinent, suggesting its potential use as a trait marker.

Electroencephalograph synchrony, which appears to be under genetic control, has also been reported as a possible trait marker in women (Propping, 1980). This could prove to be the first marker that is specific for identifying women at risk.

*Biochemical Markers.* Studies of platelet enzymes have led to two potential markers of increased risk for alcohol abuse. First, stimulated adenylyl cyclase activity was found to be lower in a group of alcoholics than in nonalcoholics (Tabakoff, Hoffman, Lee, Saito, Willard, and De Leon-Jones, 1988). Second, monoamine oxidase (MAO) activity was found to be lower in alcoholics, and on further analysis the finding was shown to be specific to type II alcoholics (von Knorring, Bohman, von Knorring, and Oreland, 1985). This finding has been replicated in

several laboratories (Pandey, Fawcett, Gibbons, Clark, and Davis, 1988; Tabakoff et al., 1988). MAO is an enzyme that is important in the metabolism of a variety of brain neurotransmitters that affect behavior, including dopamine, norepinephrine, epinephrine, and serotonin.

*Decreased Sensitivity.* Studies of individuals at high risk for alcohol abuse and dependence have also used challenge paradigms in which responses are measured to both placebos and ethanol. Results from some investigations (Moss, Yao, and Maddock, 1989; Lex, Lukas, Greenwald, and Mendelson, 1988; Savoie, Emory, and Moddy-Thomas, 1988; O'Malley and Maisto, 1985) suggest that in general these high-risk individuals may be less sensitive to the effects of alcohol than controls. They have less intense subjective feelings of intoxication following modest doses of alcohol (Schuckit, 1992). This is seen in such diverse measures as body sway, blood alcohol levels, and cortisol release following challenge. This again suggests that a genetic factor that decreases sensitivity to alcohol may play a role in the development of the illness. Schuckit (in press, 1994) has recently demonstrated that a low level of response to alcohol at age 20 was associated with a fourfold increased likelihood of future alcoholism in both sons of alcoholics and sons of controls.

*Cognitive and Motor Functioning.* There is some research that indicates that cognitive impairments are present in some children of alcoholic parents (Drejer, Theilgaard, Teasdale, Schulsinger, and Goodwin, 1985; Knop, Teasdale, and Schulsinger, 1985; Schaeffer, Parsons, and Yohman, 1984; Tarter, Hegedus, and Gaveler, 1984; Gabrielli and Mednick, 1983). The impairments are in lower verbal intelligence quotients, lower levels of reading comprehension, and problems with logic and abstract reasoning in achievement tests. These results have not been widely replicated. Some studies have found few differences on these measures when children of alcoholics are compared with controls (Drake and Valliant, 1988; Schuckit, Butters, Lyn, and Irwin, 1987), and the results that are found may pertain only to subgroups of children with multiple risk factors, such as those whose mothers had high-risk pregnancies and those with fetal alcohol effects.

## Psychosocial Risk Factors

The majority of studies on psychosocial risk factors focus on adolescent onset. Many of the studies focus on the risk of initiating use, whereas the risk of escalating to abuse or heavy use has received less

sectional, and so the results cannot distinguish factors associat alcohol use from true risk factors that precede the onset of alcoh or dependence. Because early and frequent use may lead to abuse, these factors are included in this review. Almost all of the on psychosocial risk factors fail to control for parental alcoho other mental disorder. Finally, many studies do not different tween alcohol use and other substance use.

### *Personality*

There is little evidence that individuals at risk differ from con baseline measures of personality. The lack of evidence may at t reflect methodological limitations in the studies that have been a true lack of association. However, there is one major exceptio lack of conclusiveness of personality measures—antisocial be Antisocial behavior during childhood has been consistently re alcohol problems in adulthood.

Difficulty in achievement-related activity among adolescents a proved important, with studies documenting the following p among those who later became alcoholic: poorer school perfo less productivity in high school, greater truancy, and greater in of dropping out (IOM, 1989). Aggressive behavior and the comb of aggressive behavior and shyness in the first grade have been f predict heavy alcohol use at ages 16 and 17 (Kellam, Brow Fleming, 1982). Another study yielded similar results, indicati males who were judged to be shy as children were least likely to heavy alcohol users, but those who were rated as both s aggressive as children were most likely to develop drinking p (McCord, 1988a,b). The relative risk of alcoholism has been fou higher among males in their thirties who previously used alcoh their peers when they were younger than 14 years of age (H Isberg, Lanke, Rorsman, and Ohman, 1986). Males who later alcoholic also had weaker interpersonal ties, ranging from be considerate and less accepting of dependency to having a likelihood of leaving home early (IOM, 1989).

Cloninger (1987) has proposed an association between severe related difficulties (in the type II alcoholism discussed earli personality characteristics of high levels of novelty seeking a levels of survival dependence and harm avoidance. These asso are all the more intriguing because the two disorders—alcoho and dependence and antisocial personality disorder—probab separate genetics.

Psychological factors such as low adaptability continue to influence alcohol use later in the life span. The probability of continued drinking and the eventual onset of alcohol abuse is higher if an individual is unable to develop alternative and more adaptive ways of coping with immediate situational demands, such as leaving home, changes in employment or marital status, retirement, or death of a spouse (IOM, 1989). In essence, the major determinants of problematic drinking may occur when the levels of external demand or strain are high and the individual is unable to cope with the stresses. The individual has high expectations that alcohol will produce the desired results, and he or she minimizes or denies the long-term negative consequences.

### *Contextual Factors*

Factors external to the individual and arising in the broad social environment also affect the level of use and abuse of alcohol. The contextual factors that are strong predictors of use include community use patterns (Robins, 1984) and particularly peer group behavior (Barnes and Welte, 1986). Low socioeconomic status (Murray, Richards, Luepker, and Johnson, 1987) and neighborhood disorganization (Sampson, 1985) also contribute to increased risk for alcohol problems. Contextual factors also include the availability of alcohol, such as legality, enforcement, cost, and taxes (Hawkins, Catalano, and Miller, 1992). "Contrary to the prevalent view that prohibition failed, there is substantial evidence that it reduced alcohol consumption substantially" (Goldstein and Kalant, 1990, p. 1515). Beginning with Cook and Tauchen (1982), a series of studies have suggested that increasing taxes decreases consumption. Levy and Sheflin (1985) showed that a 1 percent tax increase decreased consumption by 0.5 percent. Of the contextual factors, laws controlling availability and taxes controlling price are the simplest to change.

### *Psychosocial Aspects of Parental Alcoholism*

Parental alcoholism is associated with a constellation of other risk factors, and it is these factors plus the alcoholism itself that lead to poor outcomes in children—of which alcohol abuse is only one (see Box 6.2).

## Protective Factors

Although much investigation has focused on identifying and assessing the magnitude of various risk factors involved in alcohol use, less is known about factors that may protect individuals from abusing alcohol.

**BOX 6.2**

**Children of Parents with Alcohol Abuse and Dependence: Multiple Psychosocial Risk Factors for Their Development**

Children growing up in families in which one or both parents are alcoholics face a wide range of problems (von Knorring, 1991). First of all, many attitudes, beliefs, and expectations concerning alcohol are formed early in life. Parental alcoholism adds pressures that may promote alcohol abuse. Children of alcoholics typically have early first-hand knowledge of alcohol; although many young children can identify various alcoholic beverages, researchers have found that there is a significant association between this ability and the level of drinking in the child's home. Some family dynamics reinforce the parent's abusive drinking, and children observe this and may internalize similar family norms. Studies have suggested that inadequate parenting—including lax supervision, an absence of parental demands, lack of parental interest or affection, and, most frequently, inadequate contact—is associated with increased risk of alcoholism (Zucker and Fitzgerald, 1991). It is not known whether this finding would hold if the study had controlled for other parental psychopathology, such as antisocial personality disorder, drug abuse, or depression.

Parental alcoholism also is associated with conflict and dysfunction in the family (Schulsinger, Knop, Goodwin, Teasdale, and Mikkelsen, 1986; Moos and Billings, 1982). Alcoholic families are less cohesive, less organized, less oriented toward intellectual or cultural pursuits, and more conflict-ridden (Clair and Genest, 1987). Children of alcoholics may have an increased risk of being neglected or abused (Zucker and Fitzgerald, 1991; Tarter et al., 1984; Lund and Landesman-Dwyer, 1979), but the evidence is not substantial. Children raised under such volatile circumstances may well be deficient in their socialization, and, also, a strong association between parental alcoholism and conduct disorder has been demonstrated (Steinhausen, Gobel, and Nestler, 1984).

Certain children in alcoholic families appear to be at particularly high risk. Children who have not experienced the cohesive impact of traditional family rituals during periods in which there is severe parental drinking are more likely to develop alcohol problems than are children from alcoholic families that have been able to maintain their rituals, such as those centering on dinner time, holidays, and vacations. In addition, boys with alcoholic fathers were more likely to become alcoholics themselves if the mother seemed to accept her husband's intoxicated behavior and to hold him in high esteem. These findings suggest that one developmental path to alcoholism may stem, in part, from family acceptance of an alcoholic parent's intoxicated behavior (IOM, 1989).

### *Positive Group Norms*

Membership in structured, goal-directed peer groups that do not abuse alcohol may protect teenagers against adolescent substance abuse. The element that appears to be critical is a group norm that does not expect or approve of substance use (Hawkins, Catalano, and Miller, 1992).

### *Strong Attachments*

Brook and colleagues identified two protective factors related to attachment that reduce risk for adolescent drug use (not alcohol use specifically) (Brook, Brook, Gordon, Whiteman, and Cohen, 1990). The first was a strong attachment, or bond, between parent and adolescent and the second was a strong attachment between adolescent and father, which potentiated the positive effects of other protective factors, such as positive maternal characteristics.

### *Genetic Factors Modifying Expression of the Disorder*

There are four clearly delineated polymorphic genetic loci that appear to modify the expression of alcoholism. This is more detailed information on genetic factors than is available for any mental disorder other than Alzheimer's disease. These loci include three regions that are responsible for isozymes that catalyze the oxidation of acetaldehyde (the oxidation product of alcohol) and the region that encodes the dopamine $D_2$ receptor. The three loci encoding alcohol-metabolizing enzymes all can lead to an increase in the level of acetaldehyde following alcohol ingestion. Raised blood aldehyde levels are the basis of the flush reaction experienced by those carrying the appropriate genes. This reaction involves sweating, facial flushing, nausea, dizziness, and a feeling of faintness and is much more prevalent in Asian populations (Helzer, Canino, Yeh, Bland, Lee, Hwu, and Newman, 1990). Studies on Chinese, Japanese, and Korean populations show that these have between 30 and 50 percent expression of one of two inactive forms of aldehyde dehydrogenase, which leads to the flush reaction. In general, those affected with the flush reaction have much less tendency to abuse alcohol. This provides evidence that genetic factors can modify alcohol consumption and affect the expression of alcoholism. These factors can be modified by environmental factors, as shown by a study of men in Korea, where alcohol abuse is as high as in the West (Lee, Kwak, Yamamoto, Rhee, Kim, Han et al., 1990). Even here, those with aldehyde dehydrogenase deficiency tend to drink less than their non-affected counterparts; however, their level of abuse remains high due to cultural factors and peer pressure. This provides an interesting example of the power of environmental factors to overcome the inherent protection from alcoholism afforded by biological systems leading to acetaldehyde production.

In the case of the dopamine $D_2$ receptor, there is some limited evidence that the minor allele of the DRD2 gene on chromosome 11 is

associated with alcoholism (Blum et al., 1990). Although this allele is not linked to the manifestation of alcoholism, it may be associated with the severity of the disease (Cloninger, 1991). Thus there may be genetic factors that can modify the expression of alcoholism even though they are not directly linked to the etiology of the disorder.

## Findings and Leads

Alcohol abuse and dependence are genetically influenced disorders, and quantification of genetic risk has begun. Studies examining psychosocial risk factors for the onset of alcohol abuse and dependence have often failed to control for family history of alcoholism or other mental disorders, especially antisocial personality disorder and depression. As psychosocial risk factor research improves, more will become known about the relative and attributable risks associated with specific factors and with clusters of factors. It appears likely that it is the accumulation of both genetic and psychosocial risk factors that increases the risk for alcohol abuse and dependence. In particular, six risk factors are strongly associated with the onset of alcohol problems:

- Having a parent or other close biological relative with alcohol abuse or dependence. The mechanism may be genetic, psychosocial, or both.
- Having biological markers that are highly associated with later onset of alcohol dependence: (1) a low $P_3$ amplitude, which is a measure of a brain wave pattern (an electrophysiological marker); (2) a lower stimulated adenylyl cyclase activity or lower monoamine oxidase activity (a biochemical marker); and/or (3) a decreased sensitivity to the effects of alcohol.
- Demonstrating antisocial behaviors or a combination of aggressiveness and shyness during childhood.
- Having low adaptability and being unable to cope with immediate situational stresses, including adverse family conditions.
- Being exposed to community, neighborhood, or peer group norms that foster alcohol use and abuse.
- Having easy access to alcohol (resulting from low cost, low taxes, lenient laws, and/or minimal law enforcement).

Identification of high-risk populations should include these multiple risk factors whenever possible. Suitable preventive intervention trials could then be designed. For example, if individuals with biological markers could be identified before they use alcohol, they could be given information that might encourage them to abstain from alcohol. Also, without alcohol there would be, obviously, no alcohol abuse or depen-

dence. Therefore control of availability has been and will continue to be a powerful prevention tool.

## DEPRESSIVE DISORDERS

Major depression represents a profound biological dysregulation. Abnormalities in neurotransmitter function, the structure of sleep as measured by EEG studies, and regulation of neurohormonal response have been well documented. These can result in disturbances in eating, sleeping, energy, and attention, irritability, and distortions about the future, self-worth, and even about the value of life and living itself.

Major depression can result both from genetic influences and from severe and impairing traumatic life events. Animal models have elegantly demonstrated that a condition resembling severe depression that occurs in rats can result both from genetic influences and from environmental trauma and stress (Henn, Johnson, and Edwards, 1985). Thus, in the search for risk and protective factors, both classes of influence and their interactions are examined. Research has often focused solely on the broader category of mood disorders. In this review, evidence regarding mood disorders is used only when evidence on major depression is not available. When the older term "affective disorder" from DSM-III was used in the original research, that term is used here.

### Biological Risk Factors

#### *Genetic Vulnerability*

In terms of genetic influences, an individual's risk for mood disorders becomes larger the larger the proportion of genes shared with a mood-disordered individual. Rates for mood disorders among monozygotic twins are about three times those for dizygotic twins. The rate of concordance for mood disorders for monozygotic twins is 0.50 for unipolar disorder (major depression) and 0.70 for bipolar disorder (Tsuang and Faraone, 1990). This emphasizes both the difference in heritability for unipolar and bipolar disorder and that environmental factors play a significant role. Studies of individuals with less severe forms of depression, that is, with symptoms that do not meet criteria for disorder, show considerably less heritability (Tsuang and Faraone, 1990).

*Family Studies.* Using family aggregation studies, estimates of lifetime morbidity risks in first-degree relatives of probands with major depres-

sion range from 0.18 to 0.30 for adults (Petersen, Compas, and Brooks-Gunn, 1992). Aggregated risk is generally higher in children than in adolescents and in adolescents than in adults. Rough estimates are about 0.50 for children and 0.35 for adolescents (Tsuang and Faraone, 1990). Thus the genetic loading for child and adolescent onset of major depression may be higher than that for adult onset. Current longitudinal studies suggest that early onset may be associated with more frequent episodes of major depression during childhood. Weissman and colleagues report that individuals with an onset of major depression prior to age 20 are more likely to have family members who are depressed than those whose first episode occurs after age 20 (Weissman, Gammon, John, Merikangas, Warner, Prusoff, and Sholomskas, 1987a). Although there is strong reason to support a genetic component to depression, the exact weight of genetic and psychosocial factors remains to be determined and the nature of the genetic transmission in depressive disorders remains to be elucidated. Segregation analyses have not been helpful in elucidating a mode of transmission in mood disorders.

*Linkage Studies.* There is important work in progress regarding the forms of heritability of mood disorders. Most research has focused on bipolar disorder, but there has been some work regarding major depression. For example, Neiswanger and co-workers studied three extended families with unipolar affective illness and excluded linkage of this disorder to certain loci on chromosome 11 (Neiswanger, Slaugenhaupt, Hughes, Frank, Frankel, McCarty et al., 1990). A previous report of linkage to this region (Egeland, Gerhard, Pauls, Sussex, Kidd, Allen et al., 1987) also proved wrong when previously unaffected family members developed the illness (Pauls, Gerhard, Lacy, Hostetter, Allen, Bland et al., 1991).

### *Disease and Medication*

Major depression frequently occurs in association with medical disorders and the use of certain medications. These depressions presumably occur because of disruption in neurotransmitter function that accompanies the underlying biological processes. Severe infections; tumors; endocrine conditions, including Cushing's disease, Addison's disease, hypothyroidism, hyperthyroidism, and diabetes mellitus; the use of medications such as reserpine and other antihypertensive agents, oral contraceptives, and various anticonvulsives; and the presence of anemia, electrolyte abnormality, and various metabolic disorders all are associated with the appearance of major depression.

### *Brain Injury*

There is an association in children between brain injury and increased risk for mental disorders (Rutter, 1983). The mechanism involved in this association is poorly understood. However, it has long been observed that there is an association between various kinds of learning difficulties, in particular difficulties in learning to read, and subsequent problems with low self-esteem, which can predispose to depression.

## Psychosocial Risk Factors

### *Severe and Traumatic Life Events*

The presence of severe and traumatic events in an individual's life is associated with increased rates of major depression (Beardslee and Wheelock, in press; Coyne and Downey, 1991). Factors that have received the most attention include downward social mobility, loss of job, death of a spouse, child, or parent, divorce, and poverty. More recently, it has become clear that being the victim of child maltreatment carries with it a heavy risk for subsequent mental disorder including depression (Green, 1991). Although data are not definitive as yet, it is also likely that other severe traumas, such as being the victim of a violent crime or of a natural disaster, may predispose to depression (Coyne and Downey, 1991). In an examination of the connection between sexual assault and mental disorders in a community population, a strong association was found between history of assault and later onset of major depressive episodes (Burnam, Stein, Golding, Siegel, Sorenson, Forsythe, and Telles, 1988). There is an extensive literature to suggest that repeated negative experiences can lead to the development of a sense of helplessness, hopelessness, and low self-esteem, as well as to a sense of not being in control of one's surroundings. These overlapping conditions strongly predispose individuals to the development of depression (Petersen et al., 1992).

Whereas negative life circumstances, as described above, predispose to depression, the presence of close, intimate, supportive relationships appears to protect against it (Coyne and Downey, 1991). However, the nature of these relationships is complex. Perhaps the best model involves a major loss in childhood—the loss of a parent—and the development of subsequent depression. Brown and Harris (1989) have shown that adults who lost a parent in childhood and have become depressed not only have that risk factor, but also require a provoking agent in adulthood and the absence of good social support. In a series of

studies of inner-city women in London who had lost a parent in hood, Brown and Harris (1989) demonstrated that those who did n a close confiding relationship in adulthood and had unusually stressors developed depression. Those who had lost a parent in chi but had good relationships and no such stressors did not d depression. The authors also showed that the loss of care followi death of the parent was more important than the parental loss Further studies established that lack of care in childhood following a mother is associated with mood disturbance in adulthood. This in is mediated by premarital pregnancy and marital dysfunction. Inad care increases the risk of early premarital pregnancy, which i increases the risk of marriage to an undependable partner. Marr such a partner, in addition to being low in intimacy, increases both t of serious life events like trouble with the law, threats of evictio poverty, and the risk of depression.

### *Accumulation of Stresses at a Time of Transition*

Recent evidence in adolescent females indicates that the accum of stresses at a time of transition may place them at greater r developing depressive symptoms (Petersen et al., 1992). In try understand why the rates of disorder are so high in adolescent w Petersen and colleagues have suggested that the combination o through puberty and having a transition from one form of sch another (from primary to secondary school), along with a breakup family, form a constellation of risk factors that leads to increased r depression in this group. Clearly, the burdens of childrearing, wh adequately supported, predispose to depression (Weissman, Le Bruce, 1987b). Downward social mobility and the lack of ac opportunities also can play a role in depression (Dohrenwend et al.

### *Sociodemographic Factors*

Although in general, the foregoing risk factors are well estab detailed prospective studies of the influence of various risk facto time and the mitigating effects of other variables, for the most par not been conducted in large samples. Two notable exceptions Epidemiologic Catchment Area (ECA) study (Anthony and Pe 1991) and the Alameda County study (Kaplan, Roberts, Camach Coyne, 1987). Neither examined mood disorder in relatives, influences, or the effect of severe trauma. They did, however, e a variety of other influences. These studies excluded individua

were depressed at the time of first assessment, so that these risk factors were for first onset of depression subsequent to first assessment. Using the ECA data base, the incidence of new cases of depression in a one-year period was assessed, and the factors from the first assessment that predicted the onset of new cases in that interval were examined. These factors dealt primarily with sociodemographic information. The major risk factors that predicted episodes of major depression were being female, being separated or divorced at initial assessment, and not having paid employment or a job with prestige. For less severe forms of depression, the effects of being separated or divorced and the diminished risk among working persons were also found.

In a follow-up study in the ECA catchment area, poverty was shown to have a profound impact on onset of new cases and thus to be a significant risk factor for depression (Bruce, Takeuchi, and Leaf, 1991). Using a general measure of mental disorder, 6 percent of all new cases of all types of mental disorder occurring in a six-month interval were the result of poverty. For depression specifically, 10 percent of new cases in that interval were attributed to poverty. By extrapolating from the sample at the New Haven site in the ECA study, Bruce and colleagues estimated that during the interval of the six-month interview period, 1,200 new episodes of major depression could be attributed to poverty (Bruce et al., 1991).

In a follow-up of approximately 7,000 Alameda County adults nine years after initial assessment, low education, presence of physical disability or other chronic medical conditions, poor perceived health, a strong sense of personal uncertainty, a move of residence, job loss, financial problems, and a sense of anomie and social isolation were all associated with increased risk for depressive symptoms at follow-up, while, interestingly, marital status was not (Kaplan et al., 1987).

Mental health services are underutilized by minority groups (Hough, Landsverk, Karno, Burnam, Timbers, Escobar, and Regier, 1987). This has implications for prevention. First, such groups may have a preference for preventive services that do not require that they identify themselves as psychiatric cases. Second, prevention programs should be organized so as not to make the mistake that treatment programs did, that is, to appear to be inaccessible or unacceptable to significant segments of the population, especially ethnic minorities.

## Protective Factors

Across the life span, factors including good intelligence, easy temperament, and the presence of a supportive adult have all been shown to protect against the expression of psychopathology, including depres-

sion. In certain individuals whose parents suffer from depr resiliency in late adolescence is associated with good interp relationships, a strong sense of self, and a clear understanding and of the parent's illness (Beardslee and Podorefsky, 1988). most studies show that during adolescence the majority of chil parents with mood disorder are functioning reasonably well. At a point in time, complex interaction between risk and protective operates in children of depressed parents, and an understand these factors across the developmental course highlights opport for prevention (see Box 6.3).

### Findings and Leads

Depression is a common disorder that is seriously impairing a multiple etiologies. It is associated with a series of other disorde conditions that predispose to poor outcome. In particular, fi factors are likely to be associated with the onset of depression:

- Having a parent or other close biological relative with a disorder. The mechanism may be genetic, psychosocial, or both
- Having a severe stressor such as a loss, divorce, marital s tion, unemployment, job dissatisfaction, a physical disorder su chronic medical condition, a traumatic experience, or, in chil learning disorder.
- Having low self-esteem, a sense of low self-efficacy, and a s helplessness and hopelessness.
- Being female.
- Living in poverty.

It is appropriate to consider the possibility of programs to prev emergence of depression because of the substantial knowledg about depression, the frequency of the disorder, and the costs ated with it.

Approaches that have targeted the prevention of clinical depres high-risk adults or the prevention of depressive symptoms for t high risk because of a major loss have all shown some promi Chapter 7 for illustrations of numerous preventive intervention re programs on depression). Definitive evidence of the prevention initial episode of major depressive disorder is not available at thi Problems have included lack of large enough sample sizes, adequate follow-up, and lack of valid measurement of symptor disorders. The most successful efforts to date have been able t reductions in depressive symptomatology in high-risk groups

## BOX 6.3
## Children of Parents with Mood Disorders: Opportunities for Prevention

Having a parent with a serious mood disorder is the single largest risk factor for initial onset of depression in childhood and adolescence and, because it involves both genetic and psychosocial risk factors, is among the largest risk factors for depression across the life span. A brief review of the literature on children of parents with depression is in order both to look at how this risk factor operates and to illuminate opportunities for prevention.

### *Documentation of the Risk Factor*

For decades, it has been well established that severe mental disorder in parents is associated with increased rates of mental disorder in offspring. Recently, a series of rigorous empirical studies have been conducted using standard diagnostic instruments with the children of parents with serious mood disorders (Beardslee and Wheelock, in press; Downey and Coyne, 1990). The majority of these studies focused on parental major depression, but some focused on bipolar disorder, and therefore the more inclusive term mood disorder is used here. These studies are the result both of the recognition of childhood depression as a discrete entity and of the awareness that such children are themselves at heightened risk, particularly for depression. There is a clear consensus in the empirical research literature that children of parents with mood disorders fare much more poorly than subjects in comparison samples. A series of studies conducted by different investigators in different sites, but with similar designs, have conclusively established that the rates of adolescent depression in offspring of parents with mood disorders are at least several times higher than in children of parents with no disorder. These rates often reach 30 percent by the end of adolescence (Downey and Coyne, 1990). Children in these families also manifest impairments in adaptive and social functioning, as well as school and medical problems. Moreover, youngsters who experience depression or other serious psychopathology are largely unrecognized and untreated (Keller, Lavori, Beardslee, Wunder, and Ryan, 1991). These findings parallel findings of underrecognition and undertreatment of childhood disorders in epidemiological studies and studies of pediatric practice (Beardslee, Salt, Porterfield, Rothberg, van DeVelde, Swatling et al., 1993b). They also parallel the corresponding finding in adults that depression is underrecognized and undertreated. There is also substantial literature to indicate that children of parents with severe mood disorder are at considerable risk for a variety of poor developmental outcomes from birth to age five (Beardslee and Wheelock, in press; Downey and Coyne, 1990).

Most of the studies of the impact of parental mood disorder on children have been conducted using clinically referred parents. Extension of studies to nonreferred samples has demonstrated the same powerful effect of parental mood disorder on child outcome (Beardslee, Keller, Lavori, Staley, and Sacks, 1993a).

*(continued)*

### Parental Mood Disorders: A Constellation of Risk Factors

The strong association between parental mood disorder and poor child outcomes is not a simple relationship. Parental mood disorder is associated with a number of other risk factors, and it is this entire constellation, including parental mood disorder, that leads to poor outcomes in children. This has important implications both for understanding etiology and for fashioning preventive intervention approaches.

In children with a depressed parent, the risk of developing depressive symptoms or disorders is greatly heightened by the presence of other associated mental disorders in the parent, depressive disorder in both parents, greater chronicity and severity of the parental disorder, the presence of divorce, and disturbances in parenting (Beardslee and Wheelock, in press; Downey and Coyne, 1990). These factors suggest particular groups for targeting. Adults with mood disorder have high co-morbidity with other disorders, in particular anxiety disorders and substance abuse. Given the phenomenon of assortative mating (i.e., the tendency of people to select as mates people with the same or similar characteristics), there is a much higher than chance rate of depression in the spouse of an individual identified with mood disorder. Hence youngsters are likely to be exposed both psychosocially and genetically to depressive disorder in both parents. Moreover, there is a higher rate of divorce and marital dysfunction in individuals with mood disorder, and these are risk factors for psychopathology in children independent of depression. Finally, there is overwhelming evidence that severe depression, regardless of its cause, profoundly impairs interpersonal relationships and imposes a heavy interpersonal burden on the family.

There are numerous interactional studies examining the patterns of relationship between depressed mothers and their young children that demonstrate profound disturbances in parenting (Beardslee and Wheelock, in press). The two psychosocial factors that have received the most attention across a wide range of studies of children of parents with mood disorders are (1) interferences with the ability to parent and (2) the presence of severe marital discord and divorce (Rutter, 1990).

### Need to Study Multiple Outcomes

It is important to frame outcomes for children in developmentally appropriate terms. Outcomes reflecting depression in children from birth to age five are not diagnosable depressive disorders but impairments in cognitive functioning, psychosocial development, and attention. Depressive symptoms exhibited by school-age children are more variable but often involve interpersonal relationships, some depressive symptomatology, and some mental disorders. From early adolescence on, impairments can be classed in terms of the major diagnostic categories in DSM-III-R. For depression in one parent, the outcomes are quite variable. Some children develop anxiety disorders, some have school problems, and some develop depressive symptoms or disorders. Thus, at least for children and adolescents, preventive interventions targeting a single risk factor need to consider not a single diagnosis but a range of outcomes and a range of diagnoses.

*(continued)*

*Preventive Intervention Research*

Children of parents with mood disorders present a particular opportunity for prevention because the risk to them is well documented. Interventions must be informed by a knowledge of the specific developmental level of the child and also must involve parents and other caretakers. Interventions that enhance parenting skills, apply cognitive behavioral techniques used with adults (Muñoz, 1987), or promote understanding in adolescence are encouraging. Another approach helps parents focus on the future of the children, helps the children better understand the illness experience of the parent, and enhances resiliency in the children. Initial results of this approach to strengthening families in adversity have proved promising (Beardslee et al., 1993b).

than documenting prevention of onset of major depression. This area is one of the most promising for continued preventive intervention research.

## CONDUCT DISORDER

Conduct disorder has the earliest average age of onset of the five illustrative disorders in this report. It is an important disorder on several accounts. It is the disorder most frequently referred to child psychiatric clinics. It is hard to treat. It has a significant level of persistence into adult life and is a precursor to many other dysfunctions that give rise to impairment in adult life, including alcoholism and schizophrenia (Robins, 1966). There are at least two subtypes of conduct disorder—early onset and adolescent onset.

### Biological Risk Factors

#### *Genetic Vulnerability*

The role of genetic influences in the development of conduct disorder has been difficult to sort out. The families in which conduct problems arise often are disorganized and have a parent who exhibits either antisocial behavior or substance abuse. Thus the problem clearly runs in families, but the families also create environments that may result in conduct problems. There have not been twin and adoption studies of conduct disorder as there have been for the other illustrative disorders. In part, this is because conduct disorder is a relatively new diagnosis, appearing in the DSM for the first time in 1968. However, estimates of heritability can be obtained from adults

with antisocial disorder. It is a safe assumption that the adults with these problems did exhibit conduct disorder in childhood, but they are not representative of the entire group of individuals who have conduct disorder, many of whom will not go on to show full-scale antisocial behavior or criminality. Adult twin studies have demonstrated higher concordance for monozygotic over dizygotic twins in criminal behavior (Christiansen, 1977a,b). The use of adopted-away samples is an even better way to approach the question, but these studies are limited. Cadoret, Cain, and Crowe (1983) studied several adopted samples and concluded that both genetic and environmental forces play a role in the expression of antisocial behavior. In a large-scale Danish study of criminality, Mednick, Gabrielli, and Hutchings (1984) came to a similar conclusion that a genetic predisposition played a role in the development of criminal behavior. In 1986, Mednick and co-workers reported that biological fathers and male adoptees have much higher rates of criminality than adoptive fathers (Mednick, Moffitt, Gabrielli, and Hutchings, 1986). More recently, DiLalla and Gottesman (1989) reported that a heritable contribution to adult criminality appears more clearly established than to conduct disorder and delinquency.

Some studies thus support a role for genetic factors, but the data are inconsistent, inconclusive, and suffer from instability of diagnosis and other methodological flaws.

### *Physiological Abnormalities*

It has been proposed that physiological abnormalities underlie the symptoms of impulsivity and the failure to inhibit aggressive behaviors. Earls (in press) has reviewed the potential physiological processes in conduct disorder that might be under a degree of genetic control, and thus in part might explain the heritability of antisocial behavior, assuming that such heritability proves accurate upon future investigations. The most well-replicated physiological influence is disturbance of the autonomic nervous system, demonstrated by low heart rate, decreased amplitude and slow recovery of skin conductance, and slow EEG wave activity. Other possible, but not well-studied, influences include central neurotransmitter systems, dietary or metabolic influences, the effects of gonadal hormones, abnormal levels of platelet monoamine oxidase, and low levels of plasma dopamine B hydroxylase. Rutter and Giller (1983) have suggested that the autonomic features support a biological basis for the reported reduced anxiety and impaired passive avoidance following punishment in antisocial individuals.

later onset of conduct disorder in girls (Offord and Waters, 1983). It is still not clear whether the different ratios at the earlier ages are due to constitutional differences reflected in behavioral differences (Earls, 1987) or to differences in socialization, resulting in different learning experiences and expectations for boys than girls. What is clear is that the difference in ratios between boys and girls occurs early. In studies of young children, the precursors of conduct disorder—early behavioral problems, including oppositional behavior—are also more likely to occur in boys than girls (Earls and Jung, 1987; Richman, Stevenson, and Graham, 1982).

### *Early Temperamental Difficulties*

Temperament refers to those aspects of personality that show some consistency across time (Kazdin, 1992). Differences in temperament are based on individual characteristics such as activity level, responsiveness, consistency of mood, and social adaptability (Chess and Thomas, 1977). "Easy to manage" children are characterized by a happy disposition, adaptability to change, and a willingness to approach new stimuli. Children who are temperamentally difficult and have mentally ill parents are more than twice as likely as children with easy temperaments and mentally ill parents to be the target of parental anger and criticism (Rutter and Quinton, 1984). Children who are difficult are more likely to show later behavioral problems than children who are less difficult (Reitsma-Street, Offord, and Finch, 1985; Earls, 1981). Greenberg, Speltz, and DeKlyen (1993) point out that data from the Bloomington Longitudinal Study (Bates, Bayles, Bennet, Ridge, and Brown, 1991) show that mothers' reports of infant difficultness at six months and infant resistance to control at one year significantly predicted maternal reporting of externalizing behavior problems at ages 3, 6, and

8 years. The intermediate variable was coercive mother-child interaction during the preschool years. It is the combination of infant difficulty with family stress or dysfunction that has been found to contribute to later behavior problems (Maziade, Coté, Bernier, Boutin, and Thivierge, 1989). Conversely, easy temperament appears to act as a protective factor in these circumstances. Although these results are encouraging, the evidence for temperament as a risk or protective factor for conduct disorder is still incomplete.

### *Hyperactivity*

There is considerable co-morbidity between attention deficit hyperactivity disorder (ADHD) and conduct disorder. In the Ontario Child Health Study, 40 percent of ADHD children in 1983 also showed symptoms of conduct disorder four years later (Offord, Boyle, Racine, Fleming, Cadman, Blum et al., 1992). The difference between those with both disorders and those who remained attention deficit disordered but did not develop co-morbid conduct disorder was the level of family functioning (Offord et al., 1992). Families who are able to provide a supportive, consistent environment with expectable limits presumably allow these children to develop enough prosocial skills that they can function reasonably well in school and with their peers.

### *Cognitive and Neuropsychological Deficits*

There has been considerable debate as to whether conduct disorder precedes or follows from low intelligence, language dysfunction, or neuropsychological deficits. There is some evidence that cognitive and linguistic problems precede the behavior problems (White, Moffitt, and Silva, 1989; Beitchman, Nair, Clegg, Patel, Ferguson, Pressman, and Smith, 1986). It has been suggested that cognitive deficits, poor language comprehension, and impulsivity in aggressive children and adolescents may be related to dysfunctions in the left frontal lobe of the brain (Gorenstein, Mammato, and Sandy, 1989). The specific deficits that are seen include inability to plan, concentrate, rechannel potentially harmful behaviors, and learn from the negative consequences of behavior (Moffitt, 1993; Moffitt and Henry, 1991).

Cognitive deficits understandably lead to school underachievement, which has been consistently associated with conduct disorder. In the Isle of Wight study (Rutter et al., 1970), one third of the 10- and 11-year-olds who were severely delayed in reading showed evidence of conduct disorder, and, conversely, one third of the conduct disordered

children were at least two years delayed in their reading after allowing for IQ differences. These associations held even after controlling for family size and social class. There are four major hypotheses concerning the overlap between underachievement and conduct disorder: (1) underachievement leads to externalizing behavior, (2) externalizing behavior leads to underachievement, (3) hypotheses 1 and 2 occur simultaneously, and (4) underlying variables are the actual cause in both problems. All four hypotheses need further exploration to derive explanatory models with sufficient rigor, complexity, and validity to handle the diversity of causal factors (Hinshaw, 1992).

### *Chronic Ill Health*

Children with chronic ill health, if they also have a functional physical limitation (any sensory, physical disorder, or disability that interferes with functioning), have been found to have three times the incidence of conduct disorder as healthy peers (Cadman, Boyle, Offord, Szatmari, Rae Grant, Crawford, and Byles, 1986). Children with chronic ill health without disability have been found to have twice the incidence of conduct disorder (Cadman et al., 1986). Chronic conditions affecting the central nervous system place the child at even higher rates of risk; children with central nervous system damage have five times the incidence of conduct disorder, according to studies by Rutter (1977) and Brown and colleagues (Brown, Chadwick, Shaffer, Rutter, and Traub, 1981). It is not known whether brain damage exerts its effect primarily through the presence of cognitive disability per se or through the resulting difficult temperament on the part of the infant.

## Psychosocial Risk Factors

### *Precursor Symptoms in the Child*

Identification of patterns of early precursor symptoms may lead to identification of children and adolescents who are at especially high risk for developing conduct disorder. Beginning at ages four to six, aggression predicts later delinquency (Loeber and Dishion, 1983). When aggression is combined with other behavioral characteristics, however, the predictive power increases. A combination of aggressiveness and shyness appears to be predictive of conduct disorder as well as drug abuse (Farrington and West, 1990; Moskowitz and Schwartzman, 1989; McCord, 1988a,b; Kellam, Brown, Rubin, and Einsminger, 1983). Farrington and colleagues from the Cambridge Study in Delinquent Devel-

opment found that there was a tendency for shyness to act as a protective factor against delinquency and crime for nonaggressive boys but as an aggravating factor for aggressive boys (Farrington, 1989, 1987; Farrington, Gallagher, Morley, St. Ledger, and West, 1985). Another pattern that may predict conduct disorder is the combination of aggressiveness with peer rejection (Andersson, Bergman, and Magnusson, 1989). Finally, early substance abuse correlates with adolescent onset of conduct disorder (Robins, 1980).

The number of symptoms appears to be a better indication of the potential for serious disorder than the pattern at any one point in time (Robins and Ratcliff, 1980; Robins and Wish, 1977). Likewise, the earlier the first symptoms appear, the higher the risk may be for subsequent conduct disorder, and early onset of the disorder has been consistently linked to poorer outcomes, including serious and chronic antisocial behavior (Farrington, Loeber, Elliott, Hawkins, Kandel, Klein et al., 1990; Loeber, Brinhaupt, and Green, 1990; Tolan, 1987; Loeber and Dishion, 1983; Robins, 1966).

### *Family Adversity*

The importance of parental psychopathology as a cause of conduct disorder has been addressed in numerous studies, but as mentioned earlier, the influences of nature versus nurture have not been sorted out. A review of studies conducted from 1975 to 1985 found that criminal and alcoholic parents have a greatly increased risk of having children with conduct disorder (West and Prinz, 1987). In a large longitudinal case comparison study of 518 single-parent and 502 two-parent families, Avison (1992) found that children with externalizing problems directed toward others had mothers who were likely to score more than twice as high on measures of psychological distress and were twice as likely to have experienced problems with alcohol or to have had a major depressive episode. The same study identified that maternal alcohol problems have the greatest effect on the behaviors of younger boys.

Other studies have found that maternal antisocial personality has a profound negative effect on a child (Frick, Lahey, Hartdagen, and Hynd, 1989; Lahey, Russo, Walker, and Piacentini, 1989). Alcoholism and antisocial personality disorder in the father, combined with low socioeconomic status, are highly correlated with conduct disorder in the child (Earls, Reich, Jung, and Cloninger, 1988). The mechanism may be primarily through the poor parenting environment provided or through a genetic component. Children of alcoholics appear to have an elevated rate of truancy, more contacts with the police, and more substance

abuse and are more likely to drop out of school (West and Prinz, 1987). In addition to the influence of parental behaviors and psychopathology, it has been found that there can be a potentiation of antisocial behavior among brothers (Jones, Offord, and Abrams, 1980). However, the presence of sisters in a family tends to suppress antisocial behavior (Reitsma-Street et al., 1985).

Weiss and Hechtman (1986) studied 75 young adults and 45 normal controls matched initially on age, gender, IQ, and socioeconomic status. At 10- and 15-year follow-up into adulthood, the 25 percent of hyperactive adolescents who demonstrated significant antisocial behavior had higher initial ratings of aggressive behavior and family psychopathology.

Marital discord in families has been persistently found to predict disruptive behavior problems in boys, especially in combination with maternal depression (Rutter and Giller, 1983). It is the extent of discord and overt conflict, regardless of whether parents are separated, that is associated with the risk for antisocial behavior (Hetherington, Cox, and Cox, 1982). Grych and Fincham (1991) recently reviewed studies of marital conflict and children's adjustment, concluding that 15 of 19 relevant studies support the association between parental discord and children's psychopathology. Some studies have documented this link more specifically for conduct disorder (Jouriles, Murphy, and O'Leary, 1989). Furthermore, the effects of witnessing marital violence have recently been shown to predispose boys to use violence as a means of conflict resolution (Jaffe, Hurley, and Wolfe, 1990).

Other dysfunctional parenting practices, especially harsh, erratic, and abusive forms of discipline, also predispose to the development of conduct disorder. Patterson, Reid, and their colleagues have carefully documented how aversive behavior on the part of both child and parent, combined with parental inconsistency, create negative reinforcement patterns in which child aggression and coercion (increasingly demanding interaction) are reinforced (Patterson, DeBarysh, and Ramsey, 1989; Patterson, Chamberlain, and Reid, 1982). The combination of inadequate supervision, parental criticism, harsh and inconsistent discipline, and rejecting attitudes toward the child have been described by Patterson, Reid and their colleagues to have a specific, independent association with antisocial behavior in children.

On the basis of studies by several investigators (Widom, 1989a,b; Carmen, Rieker, and Mills, 1987; Lane and Davis, 1987), Earls (in press) has concluded that there is a strong association between child maltreatment and delinquency and adult crime in later years. Dodge and colleagues found that children who had been physically abused in

*Community Risk Factors*

Indicators of socioeconomic disadvantage, such as poverty, overcrowding, and poor housing, have been shown to be associated with an increased risk of childhood conduct problems (Hawkins, Catalano, and Miller, 1992). Socioeconomic disadvantage appears to have its effect due to the aggregation of risk factors, that is, the number of life stresses and daily hassles that inevitably have an impact on family interactions and relationships in a way that changes what Rutter has termed the "under the roof culture" of the family (including family cohesiveness, parental responsiveness, and limit setting) (Rutter, 1985a). This effect occurs predominantly in urban settings. Offord and colleagues found that low income was one of the most significant risk factors for the onset of conduct disorder, but it had its effect on children aged 4 to 11, not on adolescents (Offord, Alder, and Boyle, 1986). In an exceptionally lengthy risk study—a 30-year follow-up to measures taken in the first five years of life—Kolvin and co-workers demonstrated that low socioeconomic status of a child's family at age 5 is a powerful risk factor (Kolvin, Miller, Fleeting, and Kolvin, 1988). Of the 31 percent of males who committed either a juvenile or an adult offense, only 5 percent came from the higher socioeconomic groups, I and II, whereas 26 percent came from group III and 42 percent from groups IV and V.

Sociological studies have shown that urban areas typically have higher rates of delinquency. In Rutter's classic studies comparing children living in the Isle of Wight with those in inner London, it was found that the rates of conduct disorder were twice as high in London. Within cities with high crime rates, there is marked variation by

neighborhood (Sampson, 1985), with rates varying by a factor as large as five (Rutter and Giller, 1983). High-delinquency neighborhoods are those areas in which there is social disintegration with a high rate of social problems, including high rates of adult crime, substance abuse, infant mortality, low birthweight, and child maltreatment.

In socially disorganized communities a significant decline in the proportion of older, long-time male residents leads to an increase in youths becoming members of delinquent gangs. Having an antisocial peer group plays a part in the acquisition and maintenance of aggressive behavior. Some reports support the idea that if antisocial youth leave an antisocial peer group and join a more prosocial group their level of antisocial behavior may diminish (Osborn and West, 1980; Knight and West, 1975). Despite the risk effects that tend to congregate in large urban areas, certain high schools, which emphasize academic achievement and personal responsibility and reward prosocial behavior, have been found to reduce the risk of antisocial behavior in their students (Rutter, Maughan, Mortimore, Ouston, and Smith, 1979). On the other hand, evidence suggests that being apprehended by the police escalates antisocial behavior in youth with conduct disorder, possibly because contact with law enforcement may lead to increased antiauthoritarian attitudes (Offord, 1989).

## Accumulation of Risk Factors

Studies have consistently confirmed that as the number of adverse conditions accumulates, the risk of conduct disorder increases proportionately (Blantz, Schmidt, and Esser, 1991; Rutter, 1978). Moffitt (1990) reported that the presence of family adversity—including low education, psychiatric illness, substance abuse, and criminality in the parent; marital distress and family violence; and poverty and overcrowding—at age 5 was a significant predictor of teenage delinquency in children who showed hyperactivity and disruptive behavior problems in early childhood. The correlates of conduct disorder reported in the Ontario Child Health Study (Offord et al., 1992) indicate that the three most significant risk factors exerting independent effects on conduct disorder were family dysfunction (relative odds = 3.1), parental mental disorder (relative odds = 2.2), and low income. Low income had its effect on children aged 4 to 11 years (relative odds = 3.7) but not on adolescents. Farrington (1991) found that inadequate parental discipline and school failure, combined with economic disadvantage and family criminality, predicted juvenile convictions.

Greenberg, Speltz, and DeKlyen (1993) have suggested that there are

four domains of risk that are necessarily interrelated to produce ea onset conduct disorder. These are (1) contributions from the ch organic, biological difficulties (such as difficult temperament and ab mal psychophysiology); (2) factors in the family ecology and fa adversity, disruption, and stress; (3) ineffective parental manage and socialization; and (4) problems in early parent-child relations (s as insecure attachment in infancy and the preschool years).

It appears that it is the transactional interaction between factors ir child (such as genetic and temperamental factors) and factors in family environment (any factor that produces a lack of responsivit the primary caretaker) that produces aggressiveness in early childh Aggressive children are apt to be rejected by parents, peers, teachers. This sets up further negative interaction cycles.

Just as the accumulation of risk factors influences outcome childhood, it also influences outcomes further on in the life cycl 25-year follow-up study of children with attention deficit hyperact disorder by Hechtman has suggested that a combination of meas influence outcome in adulthood (Hechtman, 1991; Weiss and He man, 1986). These include (1) individual personal characteristics (suc IQ, health, and temperament); (2) family parameters (such as socio nomic status, family composition, mental health of family meml emotional climate of the home, and childrearing practices); and (3 larger social and physical environment.

## Protective Factors

The protective factors that reduce the chance that a child at risk develop conduct disorder include good intelligence; easy dispositio ability to get along well with parents, siblings, teachers, and peer ability to do well in school; having friends; being competent in school skill areas (Rae Grant, Thomas, Offord, and Boyle, 1989); having a good relationship with at least one parent and with c important adults (Werner and Smith, 1992).

The presence of a positive warm bond between parent and chi early childhood can lead to greater compliance and reciprocity. good relationship allows the child to empathize with another pers affective state, and, according to Minde (1992), is an essential prer site for prosocial behavior. In contrast, aggressive children ten misperceive frustration in others as hostility directed toward them, then respond aggressively (Dodge, 1980). Involvement in extracurri activities for which recognition is received (Rae Grant et al., 1989) support of t e significant adults in the community (Werner

Smith, 1992), prosocial peer groups, and good schools that foster academic success, responsibility, and self-discipline (Rutter et al., 1979) all are associated with a diminished risk of conduct disorder and more favorable outcomes, even for adolescents living in high-risk situations. Hawkins and colleagues have emphasized the role of social bonding, which refers to attachment, commitment, and adherence to the values of others (Hawkins and Lam, 1987; Hawkins and Weis, 1985). This occurs in the contexts of family, school, and peer relationships.

Good schools have been found to have a profound protective effect on students at the secondary level. Rutter et al. (1979) has described these as emphasizing academic work, reinforcing good work and behavior, providing good working conditions for students, having consistent teacher expectancies, making teachers available to deal with problems, and according responsibility to students.

## Findings and Leads

Much still remains unknown about conduct disorder, including its subtypes, the risk factors involved in its onset, and the protective factors in the child, family, and community that lead to more favorable outcomes. Both prospective, longitudinal studies that begin early in life and well-designed efforts at prevention are needed for progress to occur (Tonry, Ohlin, and Farrington, 1990).

It is the accumulation of risk factors and the interaction among them rather than any specific risk factor that is important in the onset of conduct disorder. The transactional interaction between the individual child and his or her environment over time is the ecological crucible in which the pathways to the development of a range of positive or negative childhood and adult outcomes are forged. During the early years of development, the family environment is of greater importance. As children develop and move outside the family, influences from peers, the school, and the community assume increasing importance and should be targeted for intervention studies. Preventive intervention programs must address these multifactorial risks across social settings. Knowledge will grow from research on the relative and attributable risks associated with single risk factors as well as clusters of risk factors.

The lack of twin and adoption studies in conduct disorder is a major research gap. Such data could contribute toward understanding the roles of genetic as well as environmental influences.

Because early onset has been consistently linked with poorer outcomes, preventive interventions should increasingly focus on the youngest age groups possible, especially preschoolers.

The transition from antisocial behaviors in adolescence to behaviors in adulthood especially warrants careful longitudinal The range of outcomes should include both psychiatric and n chiatric adult dysfunctions in order to elucidate the various pa during this transitional period (Earls, in press). Studies of tho viduals who do not carry over their antisocial behaviors into adu are warranted, for they could lead to clues about protective fact possibly preventive interventions.

## RISK AND PROTECTIVE FACTORS COMMON TO MANY DISO

It has become evident that even though some risk factors specific to a particular disorder, other risk factors are common t disorders. A continuing emphasis solely on the identification factors unique to *specific* mental disorders is not likely to be proc The low incidence of some mental disorders, such as schizop makes predictions based on the occurrence of presumed risk especially difficult. Instead, there may be greater value in clarify role of those risk factors that appear to be common to many disorders, especially in view of the frequent co-morbidity o disorders.

Individual risk factors during childhood can lead to a state of ability in which other risk factors may have more effect. For exa prematurely born, low-birthweight baby may be more vulnerable full-term, healthy sibling in a suboptimal family environment ( 6.4 for a description of low birthweight as a general risk Similarly, a child may be vulnerable to parent-child interaction ties by reason of a difficult temperament, a chronic physical neurophysiological deficits, or below-average intelligence. Lo associated with several mental disorders. Research also has shov between early language disabilities and the later development o behavior disorders (Dattilo and Camarata, 1991; Camarata, Hugh Ruhl, 1988; Carr and Durand, 1985; Donnellan, Anderson, and M 1984). Gender is another important genetic factor (Rutter, 1979) prenatal period and first 10 years of life, boys are more likely th to be vulnerable to both physical and psychosocial stressors. second decade, girls appear to be more vulnerable to psych stressors, and in early adulthood men once again appear to b vulnerable (Werner and Smith, 1992).

Factors in the family that constitute significant risk factors creased childhood psychopathology include severe marital c social disadvantage, overcrowding or large family size, paterna

**BOX 6.4**
**Low Birthweight as a General Risk Factor**

The vulnerability of low-birthweight children to a range of poor health outcomes including suboptimal intelligence has long been identified and has been recently reexamined in a large-scale study that included 676 low-birthweight children (under 2,500 grams) (McGauhey, Starfield, Alexander, and Ensminger, 1991). Twenty-five percent of the normal-birthweight children versus 36 percent of the low-birthweight children lived in a high-risk social environment, defined as stressful life events and a cumulative social environment risk index of ongoing stressful life conditions. Low-birthweight children were consistently more likely to have worse outcomes when exposed to a high-risk social environment than similar normal-birthweight children. However, low-birthweight children were not more likely than normal-birthweight children to have poor health outcomes in either a low- or moderate-risk social environment. Low-birthweight children were found to be consistently more likely to have poor outcomes in the presence of a high-risk social environment; thus a high-risk social environment doubled the risk of school failure and behavior problems for normal-birthweight children but quadrupled these risks for low-birthweight children (McGauhey et al., 1991).

Outcomes for very low birthweight infants (under 1,500 grams) are even more problematic. These infants are at risk not only because of their prematurity but also because of the complications of this state and the potential attachment problems associated with a long stay in an intensive neonatal care unit. Transactional interaction with family factors in this group remains an important topic for research.

nality, maternal mental disorder, and admission into the care of the local authorities, that is, child welfare services (Rutter, 1979). Community factors that impinge on children include social disadvantage, particularly the experience of being part of a welfare family. This is not simply due to income levels; with income controlled, rates of impairment have been found to be significantly higher for children from low-income welfare families than for children from low-income nonwelfare families (Offord et al., 1987). Living in subsidized housing (Rutter, 1981) and living in an area that has a high rate of community disorganization have also been found to increase the risk for mental disorders in childhood. Community institutions such as schools can either enhance or detract from intellectual and social growth and development and thus can function as a community risk or protective environment for children and adolescents (Rutter et al., 1979).

Although protective factor research has made major advances, it is less well developed than risk factor research, and several conceptual and methodological issues remain inadequately resolved (Luthar, 1993).

There is evidence, however, that a core set of individual charact and sources of support can buffer the effects of both biologic psychosocial risk factors during childhood.

Positive temperament, above-average intelligence, and social c tence can contribute to individual resilience (Rutter, 1985b; Rutte 1970). Children who are easygoing and responsive call forth th from their parents and from peers, teachers, and other adults. A average intelligence may allow a child not only to do well in sch also to develop problem-solving skills and a sense of perspecti psychological differentiation from the family or community, fo the growth of the autonomy and independence necessary for c adult functioning. Social competence includes the ability to get with others. In adolescence, having a sense of coherence and an i locus of control orientation (that is, a personal sense of being able charge of one's life) has been cited as a protective factor (O'Grad Metz, 1987).

Smaller family structure, that is, not more than four children family and spacing of more than two years between siblings, ha found to be protective (Werner and Smith, 1992). In early child having a close relationship with a parent who is responsiv accepting is very important (see Box 6.5 for a description of the of interaction with parents as a general protective factor). For children, supportive parents, good sibling relationships, and ad rule setting by parents have been found to be protective (Wern Smith, 1982). A supportive relationship with one parent was fo provide a substantial protective effect for children living in se discordant, unhappy homes (Rutter, 1985b).

Protective community factors include the relationships that ch develop outside the family, with peers, significant other adults, a available external support system such as church, youth groups, s and recreational activities, all of which build competence and p children with success (Jones and Offord, 1989; Werner, 1989; W and Smith, 1982). Good secondary schools positively affect aca achievement and, subsequently, vocational outcome. They also the rates of truancy, school dropout, and juvenile court appearan children in disadvantaged areas (Rutter, 1979).

In the Kauai Longitudinal Study, three clusters of protective differentiated the resilient group from other high-risk youth who oped serious and persistent problems in childhood and adole (Werner and Smith, 1992). These were (1) at least average intell and temperamental attributes that elicit positive responses from members and strangers; (2) good relationships with parents or

**BOX 6.5**
**Quality of Interaction with Parents as a General Protective Factor**

There is consistent evidence that the nature and quality of children's interaction with their parents affect their school performance, social competence, and interpersonal behaviors (Amato, 1989; Dornbusch, 1989). Behavior problems in the preschool years appear to vary with the extent to which parents are emotionally available to respond to their children's needs (Gotlib and Avison, 1993; Lee and Gotlib, 1991). Adequate parents are generally sensitive to their children's cues in relation to their developmental needs (Rutter, 1989). Emde (1989) has suggested that this sensitivity includes both physiological and psychological regulation of the infant's needs. Empathic responsiveness facilitates the sharing of feelings and expressions of positive social behaviors (Easterbrooke and Emde, 1988). Minde (1991) emphasized that a further parental activity related to sensitive responsiveness is the function of discipline. Normal parents encourage self-control in a child by regulating the expression of feelings. Bowlby and others have convincingly shown that the quality of the tie or attachment between parent and infant plays an important part in the overall social and emotional functioning of a child (Bowlby, 1988).

The quality of the early mother-child relationship may be affected by a number of variables, including the mother's own experience in childhood (Main and Hesse, 1990) and the presence of mental disorders (especially depression). Psychiatrically disturbed parents are generally more preoccupied with themselves and thus are less responsive to their children (Minde, 1991).

A close relationship between the child and parents during the first five years of life is especially important because primary attachment relationships are developed during this period. Children who experience multiple changes in parental figures are therefore at risk for psychosocial problems.

substitutes, which encourage trust, autonomy, and initiative; and (3) an external support system that rewards competence and provides a sense of coherence. Resilient children were reported to grow into competent, confident, and caring adults.

In general, protective factors in adulthood fall into two broad groupings—(1) those that arise from the buffering effects of social support available to the individual and (2) personality factors or personal characteristics that affect the individual's ability to cope with stress (O'Grady and Metz, 1987).

## MODELS FOR UNDERSTANDING RISK AND PROTECTIVE FACTOR INTERACTION

Understanding that risk and protective factors are common to many disorders is only a first step. It is also essential to understand that these

factors do not function in isolation; instead, there exists a dynamic interaction among them that undergoes modification and change throughout an individual's life span.

Three possible models for the ways in which risk and protective factors interact to produce competence in children are the compensatory model, the challenge model, and the protective model—all adapted from Garmezy, Masten, and Tellegen (1984).

In the compensatory model, risk factors, including genetic vulnerability and stresses, combine additively and can potentiate each other. Usually, it is the aggregation of risk factors rather than presence of any single risk factor that impairs development. This is not to say that all risk factors have equal weight; they probably do not. For example, genetic vulnerability may account for more of the attributable risk for schizophrenia than any other risk factor. However, generally, multiple risks potentiate each other. Sameroff (1987) found that children reared in families with seven or more risk factors scored 30 IQ points below children from families with no risk factors. Infancy risk factors appear to be magnified synergistically when family environments in childhood are negative or when a child is subjected to stressful life events (O'Grady and Metz, 1987).

It is evident that adverse conditions in a child's environment do not necessarily produce adverse outcomes. However, it is becoming increasingly clear that a combination of risk factors in the child and risk factors in the family environment, particularly if these are multiple, predispose the individual to negative outcomes. Rutter and Quinton (1977) suggested that a fourfold increase in the amount of stress in childhood produced a 24-fold increase in the incidence of later mental disorder. Studies have consistently demonstrated a relationship between the number and severity of life events and behavior problems. Findings for adults are similar but research findings are less plentiful (O'Grady, 1983).

The challenge model describes a curvilinear relationship in which stress as a risk factor enhances competence as long as it is not excessive. This phenomenon has been described as one of "steeling" or "inoculation" (Werner and Smith, 1982; Anthony, 1974). Murphy and Moriarty (1976) have suggested that successive, moderately challenging experiences strengthen coping capacities. The protective model suggests that protective factors modulate or buffer the impact of risk factors by, for instance, improving coping, adaptation, and competence building.

The concept of causal or etiological chains is helpful in understanding risk and protective factor interaction. Robins (1970) first described this concept as a process in which one event calls forth another in a chain that leads to an outcome. For example, consider a causal chain involving a mother and her infant:

Depressed mother ⟶ unresponsive parenting by the mother ⟶ lack of language stimulation by the mother during the child's early years ⟶ language delay in the child ⟶ learning difficulties in the child ⟶ cognitive disorder in the child.

Robins suggested that one could intervene at any point along the causal chain. Intervening at the weakest link, however, might be the most productive strategy. For example, an intervention could be aimed at improving parental responsiveness by treating the mother's depression or by providing another responsive adult in the environment to interact with the infant. In some ways, this chain is too simplistic; for example, it could continue snowballing for many years, and it does not take into account that several chains can be operating simultaneously.

Sameroff (1987) modified Robins's concept of unidirectional causal chains to include a temporal framework that is bidirectional, emphasizing reciprocal interactions between the child and the environment. In other words, how things turn out is a complex result of the interaction between the child and the family environment early in life and the child and the peer, school, and community environment in later childhood. The patterns of interaction between the child's personal attributes and risk and protective factors in the family, school, and community environments are not linear, but are interwoven—like the threads in a Jacquard tapestry—in patterns of increasing complexity. Initially, parents develop a pattern of interaction with their infants that is dependent on many factors, including their own childhood experiences, marital relationships, and the quality of their social support systems. Factors related to the child may include gender, health status, physical maturity, and temperament. Infants change the nature of their parents' responses to them, and thus the interactions change. Parents in turn have an impact on their children. Research on child maltreatment has provided illustrations of this more complex conceptualization of causal chains (see Box 6.6).

As they grow older, children carry the patterns of interaction and expectation learned in the family environment into their relationships with other adults and peers. These interactions will mold further relationship experiences and be molded by them, changing the developmental trajectory in positive or negative directions.

Things go wrong when the family environment is not able to meet the needs of the child, either because the child is too impaired or temperamentally difficult or because the parents lack responsiveness owing to their own lack of nurturing, mental disorder, or overwhelming environmental distress. Sameroff and Chandler (1975) have described this as the "continuum of the caretaking casualty"; at one end of this continuum is

## BOX 6.6
## Child Maltreatment

Research on child maltreatment was stimulated in the early 19 reports of the "battered child" syndrome in the medical literature (K Silverman, Steele, Droegemueller, and Silver, 1962). Since that time, re studies in this field have generally focused on four types of child maltrea physical abuse, sexual abuse, emotional maltreatment, and child negl

Child maltreatment serves as a useful illustration of the comp associated with identifying and addressing risk and protective factor etiological chain encompassing both social problems and mental diso is both a social problem, with its own set of risk and protective factors risk factor in itself for several mental disorders.

### *Etiology*

Although several key variables or risk factors have been associate child maltreatment, such as poverty, a parental history of abusive exper and parental psychopathology, research on the causes of child abu neglect suggests that no single variable can adequately explain the or child maltreatment. The results of etiological studies are often conflicti the predictive power of single or combined variables, such as the ind characteristics of the parent, child, or environment alone, is limite example, although a strong association has been shown between pove child abuse, the relationship is complex—most poor parents clearly abusive, and poverty alone is not a sufficient or even a necessary ante for child maltreatment.

Models of child maltreatment have evolved from isolated cause-an models to approaches that consider multiple pathways and interactive among factors that contribute to child maltreatment. Recognizing the tance of situational factors has led to the development of conten multicausal interactive models that emphasize the sociocultural cor child maltreatment. Child maltreatment is now described less as an ind disorder or psychological disturbance, and more as a symptom of an e disturbance of childrearing, often within a context of other serious problems, such as alcoholism or antisocial behavior (Wolfe, 1991; B 1979; Starr, 1979). Although studies of abusive and nonabusive paren not detected significant personality differences, research on the interac abusive and nonabusive family processes has yielded important distir Abusive parents have unrealistic expectations of their children, tend t their own children's behavior as extremely stressful, and view themse inadequate or incompetent parents (Wolfe, 1991).

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The information in this box is based in part on *Understanding Child Abuse and* (CBASSE, 1993).

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## *Child Maltreatment as a Risk Factor for Mental Disorders*

Although research has suggested a relationship between child abuse and neglect and a variety of psychosocial and mental disorders, considerable uncertainty and debate remain about the effects of child victimization on children, adolescents, and adults. For example, the majority of children who are abused do not show signs of extreme disturbance. The consequences of abuse or neglect may not become apparent until the child becomes an adolescent or an adult, and thus the connections between the experience of abuse and the short- or long-term consequences may be diffuse and uncertain.

In addition, it is often difficult to separate the experience of child victimization from other traumatic experiences that may affect the life of a child. Child maltreatment often occurs within a family context or social environment characterized by multiple problems, including poverty, violence, substance abuse, and unemployment, and the process of distinguishing the consequences of behaviors that are associated directly with the experience of child maltreatment from those that result from other social disorders and family dysfunctions is a challenging task. For example, several studies suggest that the child's experience of witnessing violence toward siblings or parents may be as harmful as the experience of victimization itself (Faller, 1988; Rosenberg, 1987; Rosenbaum and O'Leary, 1981).

Studies of physical child abuse and child neglect consistently highlight physical aggression and antisocial behavior among the outcomes associated with these forms of child maltreatment (Kaufman and Cicchetti, 1989; Walker, Downey, and Bergman, 1989; Rohrbeck and Twentyman, 1986; Hoffman-Plotkin and Twentyman, 1984; Salzinger, Kaplan, Pelcovitz, Samit, and Kreiger, 1984; Perry, Doran, and Wells, 1983). Evidence from longitudinal studies indicates continued problems of aggression and anger (Egeland and Stroufe, 1981b) and the development of conduct disorder (Rogeness, Amrung, Macedo, Harris, and Fisher, 1986). Maltreated children also appear to be less competent that their peers in social interactions (Strauss and Gelles, 1990; Howes and Espinosa, 1985). In physically abused children, lack of social competence may be manifest in withdrawal or avoidance (Kaufman and Cicchetti, 1989), whereas in other children, it appears as fear, anger, or aggression (Main and George, 1985).

The consequences of neglect can be especially severe and powerful in the early stages of child development. Drotar (1992) notes that maternal detachment and lack of availability may harm the development of bonding and attachment between child and parent, affecting the neglected child's emotional state, expectations of adult availability, problem solving, social relationships, and ability to cope with new or stressful situations (Aber and Allen, 1987; Main and George, 1985).

A prospective study of mothers who were psychologically unavailable to their infants compared their children to physically abused, neglected, verbally rejected, and control group children from the same high-risk sample (Egeland and Stroufe, 1981a). The results indicated that children in all maltreatment groups functioned poorly and their functioning deteriorated over time (Erickson, Egeland, and Pianta, 1989). Nearly all the children in this study whose mothers were psychologically unavailable were anxiously attached at 18

*(continued)*

months of age, and these children demonstrated a nearly 40-point decline performance on the Bayley Scales of Infant Development between 9 and months.

Clinical samples of maltreated children have reported a high incidence suicide attempts and self-mutilation (Green, 1978). Comparison studies physically abused and nonphysically abused children have indicated heigh ened levels of depression, hopelessness, and lower self-esteem (Allen a Tarnowski, 1989; Kazdin, Moser, Colbus, and Bell, 1985) and greater em tional difficulties in older children (Kinard, 1982, 1980). Kaufman (199 found that a disproportionate number of maltreated children met diagnos criteria for one of the major mood disorders.

Inappropriate sexual behavior, such as frequent and overt self-stimulatio inappropriate sexual overtures toward other children and adults, and play a fantasy with sexual content, are the most commonly studied symptoms studies that compare sexually abused children to children in control grou (Kendall-Tackett, Williams, and Finkelhor, 1993). Although sexually inappr priate behavior would seem relatively specific to sexual abuse, Debling and colleagues compared reports of inappropriate sexual behaviors acr groups of children who experienced different forms of maltreatment a found approximately the same percentage of sexually inappropriate beha ior in physically abused (17 percent) as in sexually abused children ( percent) (Deblinger, McLeer, Atkins, Ralphe, and Foa, 1989). Kenda Tackett et al. (1993) have found that sexually abused children were mo symptomatic than their nonabused counterparts in terms of fear, nightmar post-traumatic stress disorder (PTSD), withdrawn behavior, neurotic men illness, cruelty, delinquency, sexually inappropriate behavior, regressi behavior, and other general problem behaviors. Estimates of sexua abused children diagnosed as meeting the DSM-III-R criteria for PTSD ran from 21 percent (Deblinger et al., 1989) to 48 percent (McLeer, Debling Atkins, Foa, and Ralphe, 1988).

The majority of abused children do not become delinquent, and t majority of delinquents were not abused as children. Prospective studi estimate the incidence of delinquency in adolescents who have been abus or neglected to be about 20 to 30 percent (Widom, 1989a). There have be numerous retrospective studies linking childhood maltreatment, especia sexual abuse, to specific forms of adult psychopathology, including mo disturbance, post-traumatic stress, self-injurious behavior, substance abu somatization, eating disorders, multiple personality disorder, and interp sonal violence. As with all retrospective studies, the validity of recall inf mation is of questionable value.

### *Prevention of Child Maltreatment*

Most programs to prevent child maltreatment have lacked methodologi rigor, and their findings are equivocal. However, two research programs—t Prenatal/Early Infancy Project in Elmira, New York (see Chapters 7 and 11) a the Children and Youth Program (Hardy and Streett, 1989) have met w significant success and have demonstrated a reduction in child maltreatme

an adaptive family environment that can meet the needs of the organically damaged or temperamentally difficult infant, and at the other end is the disordered family environment that cannot meet the needs of the least distressed, most healthy, normal, temperamentally easy newborn. In between are the majority of average environments that provide "good enough" parenting.

In discussing the ways in which early events might be linked to later outcomes, Rutter (1989) emphasized that not only continuities but also discontinuities are found between events in childhood and subsequent adult outcomes. Some risk pathways turn into more adaptive routes because of adventitious happenings. For example, a child from a dysfunctional family who is physically abused and then placed in a foster home has started on a life course of negative events. However, a continuous negative cycle is not predetermined; the course could be altered by an especially good relationship with the foster parents. This relationship could produce a discontinuity in the life course that had been expected prior to placement. Rutter (1989) has demonstrated that children at risk early in life who subsequently had good school experiences were three times more likely to show planning in their choice of life career or marital partner than those who had poor school experiences. Similarly, for women earlier at risk because of institutional experiences, the presence of marital support was found to lead to good social functioning and good parenting, in contrast with those who did not receive good marital support (Quinton and Rutter, 1988).

Werner and Smith (1982) have suggested that the interaction of risk and protective factors is a balance between the power of the person and the power of the social and physical environment. A balance is necessary throughout life, although different factors vary in importance at different developmental stages. These authors suggested that constitutional factors are more important during infancy and childhood and interpersonal factors are more important during adolescence. However, certain genetic vulnerabilities may not be potentiated until later in the life span. For example, schizophrenia usually appears in later adolescence, and Alzheimer's disease appears late in life. Adaptation at all ages appears in large part to be a function of the individual's ability to elicit predominately positive responses from others in his or her environment.

## MAJOR FINDINGS AND PROMISING LEADS

Mental health outcomes depend on the interactions of risk and protective factors in the child, the family, and the wider environment. The nature, timing, severity, and length of particular risk factors and the

gender, age, and cultural identity of the individual are all key va
in determining mental health outcomes.

It appears that most risk and protective factors, other than
factors, are not specific to a single disorder. Much remains to be l
about both risk and protective factors and their interaction. There
this time the most fruitful approach for preventive interventions
to use a risk reduction model that includes the enhancement of
tive factors and to aim at clusters or constellations of risk and pro
factors. Markers can be used to identify high-risk populations,
interventions will be aimed at those causal and malleable risk
that appear to have a role in the expression of several mental dis
Identification of relative and attributable risks associated with
clusters of risk factors could greatly facilitate preventive inter
research.

Risk factors, including markers, should always be reviewed in r
to their rate of occurrence in the normal population. A given risk
may not be unique to those individuals who will eventually de
mental disorder. It may be quite prevalent in normal populatio
thus will not—by itself—be especially useful in identifying indivi
risk. For example, increased cerebral ventricular size occurs in
individuals with schizophrenia, but it also occurs in about 4 per
persons without the disorder. Screening a general populat
ventricular size would identify more nonschizophrenics than pre
phrenics. A similar lack of specificity would probably resul
screening for many, if not most, other risk factors—such as aggr
ness, poverty, and life stress—in general populations. Thus
factors are best used in combinations. It is the accumulation
factors, with appropriate weighting of the relative importance
factor, that will yield the targets with the most potential for prev
of later onset of mental disorder(s).

The task in preventive interventions is to decrease risk and/or i
protection in the individual, the family environment, and the
environment with which the individual comes into contact. But
risk factors need to be reduced. Even reducing some in a m
situation is likely to result in more advantageous outcomes. Bec
developmental changes, the timing of the reduction of risk may l
more critical than the number of risk factors addressed. Conver
the number of protective factors can be increased in the indi
family, and community, then resilience is likely to be increased a
disorder may be avoided.

General risk factors may lend themselves to universal pre
in ry tion onsonant with broad community mental health

that focus on public education and social welfare. Risk factors specific to a particular group of people can be addressed in selective preventive interventions. Individuals with early behavioral symptoms or markers are potential recipients of indicated preventive interventions. Risk reduction would seem to be a promising approach for prevention. The question that remains is whether it is being widely and successfully used. This issue is addressed in Chapter 7, which reviews illustrative preventive intervention research programs.

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# 7

# Illustrative Preventive Intervention Research Programs

Although preventive intervention research is still a relatively young field and formidable tasks lie ahead, the past decade has brought encouraging progress. At present, there are many intervention programs that rest on sound conceptual and empirical foundations, and a substantial number are rigorously designed and evaluated. From a mental health perspective, these interventions are consistent with—even though they do not prove—the hypothesis that serious psychological problems can be avoided by preventive action before the onset of a diagnosable disorder.

In this chapter the committee selects a limited number of these interventions to illustrate a range of promising program approaches to achieving diverse prevention goals. This review of preventive interventions is based on three principles presented in earlier chapters in this report: (1) Prevention of the initial onset of mental disorders can be accomplished through intervention programs aimed at risk reduction, which can include both reduction of causal risk factors and enhancement of protective factors. The goal is to address malleable, or modifiable, risk and protective factors related to the onset of disorders, including precursor symptoms, to reduce the incidence of mental disorders or at least to delay their onset. However, even if the interventions fail to prevent a disorder, they may have some effect on reducing the severity or duration of the disorder. (2) Preventive intervention programs can be successfully implemented at all three levels—universal, selective, and indicated—described in Chapter 2. (3) Preventive intervention programs can be initiated throughout the life span.

The committee reviewed numerous prevention programs that w supported by federal agencies and private foundations. A wide net cast in soliciting nominations, but the search could not be exhaustiv majority of the prevention programs that currently exist are ser programs and demonstrations that have not incorporated rigo research methodologies. Even those that have an evaluation compo usually have not used rigorous standards for assessment of effec ness. Thus the nation is spending billions of dollars on programs wh effectiveness is not known. Most of the prevention programs discu in this chapter meet the criteria listed below, including the use randomized controlled trial design. Such a high standard lends cred to the results of these studies. These program illustrations demons that rigorous protocols can be applied to complex interventions, yiel tangible outcomes.

Many of the prevention programs that were reviewed used qu experimental designs. Where their findings provide some confirma evidence for a study with a randomized controlled trial design, or w their findings provide new leads in areas where there have beer randomized controlled studies, the information is briefly discusse the chapter. Also, three well-known service projects that have not b rigorously evaluated are presented to highlight the potential for ap ing experimental designs to preventive interventions created by pr tioners. All prevention program titles are in italics. Titles of progr that met the criteria for use as full illustrations are preceded by asterisk. These illustrative programs are also listed in Table 7.1 and abstracted in more detail in the background materials (program abst are available as indicated in Appendix D).

The programs target different age groups and are arranged her developmental sequence from gestation through old age. As indi uals move from one stage to the next, the developmental tasks fa them change, as does the nature of the risk and protective factors. life course presentation serves to emphasize the importance of co nuity and integration of interventions across the entire life s Prevention programs that lasted for several years and bridged suc sive developmental phases or had effects on more than one genera are presented in this chapter at the earliest developmental phase the end of each section, several findings and leads that emerged f the review of programs addressing that age group are listed. The o of the points does not imply priority, and the list is not meant t comprehensive but rather to illustrate the sorts of patterns, proble and directions for future work that can be learned from suc perspective.

## CRITERIA FOR EXAMINING PREVENTIVE INTERVENTION PROGRAMS DESCRIBED IN THE LITERATURE

As a basis for selecting the illustrative preventive intervention research programs, the committee formulated six criteria. The criteria pertain to (1) the risk and protective factors addressed, (2) the targeted population group, (3) the intervention itself, (4) the research design, (5) evidence concerning the implementation, and (6) evidence concerning the outcomes. Each of these criteria is described in detail below. In addition, Figure 7.1 displays these criteria in a format that may be useful to the reader in future examinations of published prevention programs.

### Description of the Risk and Protective Factors Addressed

A well-documented description of the risk and protective factors addressed in the preventive intervention and how they relate to developmental tasks of the targeted group is a critical scientific first step. Without such specification, the rationale for identifying any group for intervention will be difficult to provide. Furthermore, the accumulation of data about well-documented risk and protective factors is essential to the design of preventive interventions, and the identification of malleable, or modifiable, risk factors is crucial to the success of prevention efforts built on the risk reduction model.

In identifying risk and protective factors, the causal status of the risk or protective factor is crucial. Some risk factors may not be causal but are nevertheless useful for identifying and targeting high-risk populations. The risk factors used to target the population may not always be the risk factors that one is attempting to modify through an intervention.

Although definitive scientific evidence of the causal role that a risk or protective factor plays in the development of mental disorder is seldom available until an intervention is tried, certain critical pieces of evidence should be in place. For example, there should be epidemiological evidence to suggest that the risk or protective factor is statistically correlated with the incidence or prevalence of the disorder itself. Furthermore, evidence that the risk or protective factor precedes the disorder is an important indication that the factor has at least a potential role in causation. Also, there may be a dosage effect, that is, the stronger the risk factor, the more disorder. In addition, the mechanism or process through which the risk or protective factor potentially operates should be specified. For example, a protective factor may affect risk either directly by operating on the antecedent risk factor itself or indirectly by affecting the strength of the relationship between the risk factor and

Program Name _____ Investigator(s): _____
Reference(s): _____

| 1. Description of the Risk and Protective Factors Addressed | 2. Description of the Targeted Population Group | 3. Description of the Intervention Program | 4. Description of the Research Methodologies | 5. Description of the Evidence Concerning Implementation | 6. Description of the Evidence Concerning Outcomes |
|---|---|---|---|---|---|
| Documentation | Universal, selective, or indicated | Goals and Content | Methods of recruitment | Exposure of target group to intervention | Changes in status of risk and/or protective factors |
| Relationship to developmental task | Evidence that group is at risk for disorder or problem | Protocols | Sample size | Fidelity of delivery in accordance with design | Evidence of reduction of new cases |
| Causal status | Sociodemographic variables | Personnel delivering the intervention | Randomization | | Evidence of delay of onset |
| Status in malleability | | Site | Baseline measures | | Side effects |
| Correlation with incidence and prevalence | | Institutional or cultural content | Statistical analysis | | Benefit-cost and cost-effectiveness analyses |
| | | Ethical considerations | Attrition of subjects | | |
| | | Equipment or instrumentation | | | |
| | | Method of delivery and techniques | | | |
| | | Duration and extent | | | |
| | | Multiple components | | | |

FIGURE 7.1 A framework for examining preventive interventions. This format might be used as

some mental health outcome. A protective factor may also operate by affecting some mediating mechanism that stands causally between the risk factor and the development of mental disorder.

Ultimately, it is important that the risk and protective factors addressed in the prevention program be explicitly identified and established as risk and protective factors in rigorous scientific studies. As scientific evidence converges on particular sets of risk and protective factors, interventions addressing them become more plausible and more likely to succeed.

### Description of the Targeted Population Group

A description of the characteristics of the targeted group is another critical ingredient. As described in Chapter 2, universal preventive interventions are provided to entire populations; selective preventive interventions are targeted toward groups or individuals with high lifetime or high imminent risk; and indicated preventive interventions are targeted toward high-risk individuals on the basis of the individual's minimal, but detectable, behavioral symptoms that could later develop into a full-blown mental disorder, or the individual's biological markers that identify him or her as being at especially high risk.

Because our knowledge of precursor signs and symptoms of mental disorders is only preliminary (for example, no standardized lists of these exist), it is often difficult in practice to distinguish between selective and indicated interventions. We are just beginning to understand which risk factors contribute in a general way to multiple disorders and which are actually precursor symptoms for a single disorder. For example, in the causal chain leading to conduct disorder, aggressive behaviors at ages 4 to 6 are stable predictors of later problems and could be used to trigger an indicated intervention. Farther along the chain, at ages 9 to 11, academic difficulties also begin to stabilize as predictors of later conduct disorder and substance abuse. At this point the academic problems are not just a general risk factor for multiple disorders; they are also a precursor symptom for conduct disorder and can also be used to target an indicated population. The committee believes that the exercise in distinguishing between selective and indicated targeted populations is a useful one—and has attempted to do it for the illustrations given here—for it allows us to see more clearly where past efforts have been directed and how successful they have been. In addition, the distinction provides clues as to what degree of specification of targeted group tends to produce the best outcomes.

Specifying the targeted group is important for evaluating the degree

to which the group actually displays the purported risk factors, evaluating the actual and potential impact of the intervention, and replicating the intervention. For example, scientific evidence should provided to indicate that the group targeted actually is a group at risk a particular disorder, cluster of disorders, or problem, and, if kno the degree to which the group is at risk should also be provided.

The targeted group should be described not only in terms of its and protective factors but also in terms of a combination of sociode graphic variables, including such characteristics as gender, age, r socioeconomic status, living conditions, exposure to major life tra tions, and family configuration. The number of participants and distribution of sociodemographic characteristics in various experime and control conditions should also be specified. Finally, becaus potential effects on outcomes, there should be a description of recruitment process and the consent process.

### Description of the Intervention Program

All too often, treatment interventions as well as preventive inter tions lack adequate description. This lack of specification is someti due to restrictions imposed by journal publication formats. In o cases, adequate descriptions of intervention protocols, including d ments such as intervention manuals and training programs for deli of the intervention, are simply missing. This is a danger sig impeding evaluation.

Adequate descriptions of the goals and content of the interven and of the personnel delivering the intervention, including their pr sional qualifications and/or training for the delivery of the interven are needed. Detailed descriptions of the intervention site, inclu information on physical surroundings; the institutional and cul context; special ethical considerations; and special physical aspec the environment, including equipment or instrumentation, are c elements.

The actual methods of delivery must also be described, including use of any special techniques, such as media devices and lear exercises. In addition, there must be a clear indication of the dura and extent of the intervention, including the prescribed lengt exposure to the intervention by individuals or groups, whether boo sessions after the main intervention are required, and if so, at v intervals.

Finally, many preventive interventions have multiple compon that are designed to work in an additive, sequential, or intera

fashion. Each of the components, modules, or stages ought to be described in enough detail that replication is possible.

### Description of the Research Methodologies

The choice of research methodologies is a major issue in examining preventive interventions and the research trials designed to determine their outcomes. It heavily determines whether evidence is compelling that a preventive intervention could have produced its intended effect.

The ideal research design in a preventive trial is a randomized controlled trial of adequate size embedded in a longitudinal study. However, a variety of other designs, including group comparisons such as pretest-posttest, and quasi-experimental designs such as interrupted time series and regression discontinuity, are often employed. Such designs may be particularly necessary for large-scale community interventions. Although such designs have the potential for yielding useful data, they are less desirable than true randomized experimental designs. Such designs also require detailed descriptions of comparison groups, including methods of recruitment and any other information that might allow evaluation of comparison groups.

The research design should include appropriate use of statistical methods and account for attrition of participants through appropriate use of weighting procedures, statistical modeling of attrition effects, or the conservative use of full randomized designs even where attrition has taken place (Kraemer, 1992; Cohen, 1988; see also commissioned paper by Kraemer and Kraemer in the background materials, available as indicated in Appendix D).

Even when randomized assignment is possible, attrition is still a threat. It is frequently still necessary to confirm that randomized assignment has had its intended effects by comparing experimental and control groups on sociodemographic characteristics and other characteristics in addition to the outcomes. Furthermore, designs that employ appropriate and sufficient baseline measures, such as data on intelligence, personality, and physical health, are highly desirable because variables that appear extraneous are potentially significant. Inclusion of such measures has become standard practice for the evaluation of most randomized trials.

### Description of the Evidence Concerning the Implementation

How well the intended objectives and processes of the intervention were actually implemented needs to be examined even when an

adequate, detailed description of the intervention program is av
The critical issue is whether the intervention was delivered ir
dance with its design. It is important to assess the degree to
targeted participants actually were exposed to the interventio
wherever possible, the degree to which there were variations i
sure or dosage. The degree to which the intervention was deliver
fidelity can be determined if evidence is provided through
program data collected by external observers, through detailed p
archives documenting contacts with participants, or through kno
obtained from participants who were targets of the intervention

### Description of the Evidence Concerning the Outcome

The final element to be examined is the outcomes. Most fun
tally, evidence should be provided that risk or protective facto
been changed. Without at least preliminary evidence that the in
tion was successful in reducing risk factors or increasing pr
factors, or in showing that protective factors reduced the strengt
relationship between risk factors and outcomes or affected some
esized mediating process, the claim that the intervention had a
on some aspect of the causal chain leading to disorder becon
convincing.

Other obvious sources of evidence of preventive effects woul
actual reduction in the observed rate of new cases of disord
delayed onset of disorder in the experimental group. It is
possible for a trial to provide evidence that the incidence of a pa
disorder was reduced or the onset was delayed without clearly s
the mechanism of action by which the effect occurred. Acco
trials should, if possible, identify evidence not only on rates an
onset of disorder but also on effects on risk or protective factor

Still other outcomes are important to assess. These inclu
identification of unanticipated side effects, data regarding the co
benefits of the intervention, and any benefit-cost or cost-effec
analyses conducted as part of the intervention evaluation. H
information on side effects and benefits and costs rarely ha
included in published reports. Increasingly, it should become a s
part of the evidence on outcomes.

## A DEVELOPMENTAL PERSPECTIVE

With these criteria in mind, the committee reviewed the pre
intervention research using, as an organizing conceptual framev

understanding of human development throughout the life span. As mentioned above, each developmental phase brings new tasks to be accomplished; each is accompanied by potential biopsychosocial risk factors as well as opportunities for growth. Just as each individual is continually changing and evolving, risk and protective factors emerge and disappear over time or, if present for a long time, may express themselves differently. Likewise, outcome variables may need to vary through developmental stages. Figure 7.2 illustrates the conceptual framework of the life course of human development, with developmental tasks and corresponding social relationships and settings, such as family of orientation and peer group, which are the appropriate targets and contexts for preventive interventions. (See Table 7.1 for a summary of research programs corresponding to this life course framework.)

## INTERVENTIONS FOR INFANTS

In infancy, the biopsychosocial risk factors that can hinder development include, but are not limited to, preventable infections, disease, or injuries that can cause brain damage, neurodevelopmental disorders, or behavioral disorders; problems of parent-infant attachment or parenting; deprivation of cognitive and language stimulation; economic deprivation; and child maltreatment. The corresponding protective factors of robust health and "good-enough" parenting—coupled with adequate nutrition and shelter—encourage the physical, intellectual, and emotional growth of the child.

In recent years, there have been notable increases in infants and children at risk for developmental impairments, and in infants and children already showing such problems (Rickel and Allen, 1987). Unemployment, deteriorating neighborhoods, increased violence, and lack of access to medical care have all contributed to this problem (see Chapter 6 on risk and protective factors). The Center for the Study of Social Policy (1992) concluded that our nation has failed to keep pace with the needs of its youngest citizens: over the 1980s child poverty expanded, births to unmarried teens climbed, more children were living in families with only one parent, and more babies were being born at risk because they were underweight.

Although the larger societal and structural issues will require societal and macroeconomic solutions, a number of creative and comprehensive programs have shown that it is possible to address the adverse effects on mothers and children of the heightened risks caused by these social changes. Preventive intervention strategies that have been used during infancy to target babies and their parents include high-quality prenatal

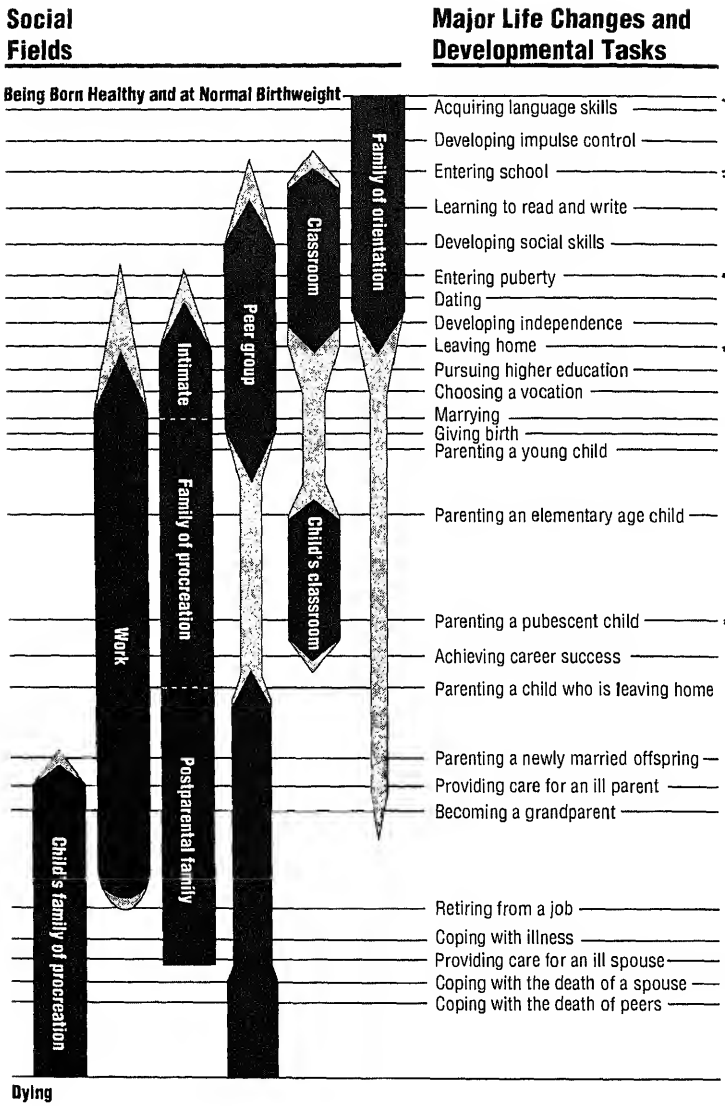


FIGURE 7.2 Developmental tasks and social fields for preventive over the life course. Source: Adapted from Kellam, S. G.; Branch, J. K. C.; Ensminger, M. E. (1975) Mental Health and Going to School University of Chicago Press.

and perinatal care, childhood immunization, regular home visitation, parenting education, promotion of healthy parent-infant interaction, appropriate cognitive and language stimulation, well-baby health care, family support, and center-based infant day care.

## Physical Health Interventions with Applications to Mental Health

### *High-Quality Prenatal and Perinatal Care*

Prenatal and perinatal care provide examples of universal preventive interventions directed at the entire population of pregnant women for the protection of the developing fetus and the newborn baby. There is a strong general health promotion and wellness aspect to prenatal care, but such care is also known to prevent prematurity and low birthweight, as well as specific disabilities and disorders in newborns.

There is general agreement that all pregnant women should receive early, regular, and comprehensive prenatal care. In *Healthy People 2000: National Health Promotion and Disease Prevention Objectives* (DHHS, 1991), the U.S. Public Health Service affirmed that ensuring all infants a healthy start in life and enhancing the health of their mothers must be a top priority in the 1990s if we are to ensure the future health of the nation. Despite this consensus, however, there continue to be large numbers of women in the United States who do not receive prenatal care. Teenage mothers, mothers who are members of disadvantaged minorities, and unmarried mothers all tend to receive prenatal care that is late or inadequate, or they receive no prenatal care at all (IOM, 1985). Well-established medical guidelines define the timing and protocol for appropriate prenatal care, but frequently these are not followed for these high-risk groups (IOM, 1985).

Lack of prenatal care has important implications for mental disorders. Inadequate or absent prenatal care is the main cause of a mixed group of preventable disorders that appear in low-birthweight babies. In the United States, there are disproportionately high rates of low-birthweight babies in some racial and ethnic groups, particularly among African-Americans (Center for the Study of Social Policy, 1992). Low-birthweight babies constitute about 60 percent of all infant deaths. Those babies that survive often do so with major lifelong disorders, such as mental retardation and cerebral palsy, as well as behavioral, emotional, and learning problems (IOM, 1985). There is also some preliminary limited evidence that pregnancy and birth complications may play a role in later development of schizophrenia (see Chapter 6). Improving prenatal and perinatal care and delivering this care to all pregnant

TABLE 7.1 Illustrative Preventive Intervention Programs Using Randomized Controlled Trial Design

| | Targeted Population Group/Sample Size When Project Began | Risk Factors Addressed | Outcomes (for total intervention group or subgroups) | Principal Investigator(s) and Year(s) |
|---|---|---|---|---|
| *Infants* | | | | |
| Prenatal/Early Infancy Project | Selective/ N=394 | Economic deprivation, maternal prenatal health and damaging behaviors, poor family management practices | Improved maternal diet and reduced smoking during pregnancy, fewer preterm deliveries, higher-birthweight babies, less child abuse | Olds, 1988, 1986 |
| Tactile/Kinesthetic Stimulation | Selective/ N=40 | Preterm delivery, low birthweight | Better physical and mental development of infants | Field, 1986 |
| Early Intervention for Preterm Infants | Selective/ N=60 | Teenage parenthood, low socioeconomic status, preterm delivery | Better parenting behaviors and attitudes of mothers, better cognitive competence, better physical development, better temperament of infants | Field, 1980 |
| Infant Health and Development Program | Selective/ N=985 | Low birthweight, poor family management practices, | Better cognitive competence, fewer behavior problems | Ramey, 1990 |

| | | | | |
|---|---|---|---|---|
| ***Young Children*** | | | | |
| Houston Parent-Child Development Center | Selective/ N=~700 | Economic deprivation, academic failure, early behavior problems, poor family management practices | Better family management practices, fewer behavior problems | Johnson, 1991, 1990 |
| Mother-Child Home Program of Verbal Interaction Project | Selective/ N=156 | Academic failure, economic deprivation, poor family management practices, early behavior problems | Better family management practices, better cognitive competence | Levenstein, 1992, 1984 |
| Parent-Child Interaction Training | Indicated/ N=105 | Economic deprivation, early behavior problems, poor family management practices, maternal depressive symptoms | Lower rates of attention deficits and conduct problems | Strayhorn, 1991 |
| High/Scope Preschool Curriculum Comparison Study (including Distar) | Selective/ N=68 | Academic failure, early behavior problems, economic deprivation | Better cognitive competence | Weikart and Schweinhart, 1992, 1986 |
| Perry Preschool Program (using High/ Scope curriculum) | Selective/ N=123 | Academic failure, economic deprivation, early behavior problems, low commitment to school | Better cognitive competence, greater achievement and school completion, better vocational outcomes, fewer conduct problems and arrests | Weikart and Schweinhart, 1987, 1984 |
| I Can Problem Solve: Interpersonal Cognitive Problem-Solving Program | Selective/ N=219 (N=60 in pilot study) | Economic deprivation, poor impulse control, early behavior problems | Better cognitive problem-solving skills, fewer behavior problems | Shure and Spivack, 1982, 1979 |
| ***Elementary-Age Children*** | | | | |
| Assertiveness Training Program (program 1) | Universal/ N=343 | Early behavior problems, academic failure | Improved social assertiveness, improved academic performance | Rotheram, 1982 |

*(continued)*

TABLE 7.1 (*Continued*)

| | Targeted Population Group/Sample Size When Project Began | Risk Factors Addressed | Outcomes (for total intervention group or subgroups) | Principal Investigator(s) and Year(s) |
|---|---|---|---|---|
| Assertiveness Training Program (program 2) | Indicated/ N=101 | Early behavior problems, academic failure | More assertive behavior, better school achievement, fewer behavior problems | Rotheram, 1982 |
| Children of Divorce Intervention Program | Selective/ N=75 | Marital conflict and separation, early conduct problems | Lower anxiety, fewer learning problems, better adjustment | Pedro-Carroll and Cowen, 1989, 1986, 1985 |
| Family Bereavement Program | Selective/ N=72 | Child bereavement, poor family management practices, early behavior problems | Lower levels of symptoms of depression and conduct disorder | Sandler, 1992 |
| Social Skills Training | Selective/ N=28 | Peer rejection, early conduct problems | Less peer rejection, better interpersonal skills | Bierman, 1986 |
| Social Relations Intervention Program | Indicated/ N=86 | Early behavior problems (aggression), peer rejection, impulsivity | Less aggression, less peer rejection, more prosocial behavior | Lochman, in press |
| Montreal Longitudinal-Experimental Study | Indicated/ N=172 | Poor family management practices, peer rejection, academic failure, early behavior problems, violence on television | Less aggressive behavior, less delinquent behavior, better school achievement | Tremblay, 1992, 1991 |
| Community Epidemiological Preventive Intervention: | Universal/ N=2314 | Academic failure, aggressive and antisocial behavior, | Less aggressive and shy behavior, better cognitive | Kellam and Rebock, 1992 |

| | | | | |
|---|---|---|---|---|
| Academic Tutoring and Social Skills Training | Selective/ N=40 | Academic failure, peer rejection, early behavior problems, early depressive symptoms | Better cognitive competence, less peer rejection | Coie and Krehbiel, 1984 |
| Seattle Social Development Project | Universal/ N=908 | Poor family management practices, early behavior problems, low commitment to school, academic failure | Better family management practices and family bonding, greater attachment to school, lower rates of delinquency and drug use initiation | Hawkins and Catalano, 1988 |
| *Adolescents* | | | | |
| Changing Teaching Practices | Selective/ N=1166 | Low commitment to education, academic failure, behavior problems | Greater attachment and commitment to school, lower rates of school suspension for misbehavior | Hawkins, 1988 |
| Positive Youth Development Program | Universal/ N=282 | Early drug use onset, favorable attitudes toward drugs, social influences to use | Better coping skills, better stress management strategies, better conflict resolution and impulse control, less excessive alcohol use | Caplan and Weissberg, 1992 |
| Adolescent Alcohol Prevention Trial | Universal/ N=3011 | Attitudes favorable to the use of drugs, social influences to use, early onset of drug use | Lower rates of tobacco, alcohol, and marijuana use, lower prevalence of problem alcohol use and drunkenness | Hansen and Graham, 1991 |
| ALERT Drug Prevention | Universal/ N=6527 | Social influences to use, early onset of drug use, attitudes favorable to the use of drugs | Lower rates of tobacco, alcohol, and marijuana use | Ellickson and Bell, 1990 |
| Alcohol Education Project | Universal/ N=2536 | Favorable attitudes toward alcohol consumption, early onset of alcohol use, association with alcohol-consuming friends, community norms favorable toward alcohol use | Less initiation of alcohol use, increased knowledge about alcohol, decreased use among those drinking prior to study | Perry et al., 1989 |

*(continued)*

TABLE 7.1 (*Continued*)

| | Targeted Population Group/Sample Size When Project Began | Risk Factors Addressed | Outcomes (for total intervention group or subgroups) | Principal Investigator(s) and Year(s) |
|---|---|---|---|---|
| Midwestern Prevention Project | Universal/ N=5065 | Social influences to use, early onset of drug use, attitudes favorable to the use of drugs | Lower rates of tobacco, alcohol, and marijuana use | Pentz, 1989 |
| Behaviorally Based Preventive Intervention | Indicated/ N=80 | Academic failure, early behavior problems, alienation from family, low commitment to school | Less conduct problems and delinquency | Bry, 1992 |
| Intervention Campaign Against Bully-Victim Problems | Universal/ N=2400 | Aggressive behavior, poor family management practices, favorable attitudes toward bullying/aggression | Less bullying, less delinquent behavior, more attachment to school | Olweus, 1991 |
| ***Adults*** | | | | |
| Prevention and Relationship Enhancement Program (PREP):An Empirically Based Preventive Intervention Program for Couples | Universal/ N=135 | Couple relationship problems | Better marital adjustment, less divorce, less physical violence | Markman, 1992 |
| University of Colorado Separation and Divorce Program | Selective/ N=153 | Marital separation/divorce, anxiety, depression, childrearing problems, economic problems | Fewer symptoms of anxiety and depression, better vocational outcomes | Bloom and Hodges, 1985, 1982 |

| | | | | |
|---|---|---|---|---|
| Perceived Personal Control Preventive Intervention for a Caesarean Birth Population | Selective/ N=70 | Caesarean delivery, depressive symptoms | Lower levels of postpartum depression, more rapid physical and psychological recovery | Tadmor and Brandes, 1988, 1984 |
| Prenatal/Early Infancy Project | Selective/ N=394 | Single parent status, school dropout, economic hardships, joblessness, subsequent pregnancy | Better vocational adjustment, fewer second pregnancies, better educational achievement | Olds, 1988 |
| Caregiver Support Program for Coping with Occupational Stress | Selective/ N=247 | Occupational stress, distress, anxiety, depression | Lower psychological distress, better job satisfaction | Heaney, 1992 |
| JOBS Project for the Unemployed: Michigan Prevention Research Center | Selective/ N=928 | Involuntary job loss, anxiety, depression, alcohol abuse, marital stress | Fewer depressive symptoms, higher pay, cost-effective outcomes | Vinokur, Price, Caplan, and van Ryn, 1992, 1991 |
| San Francisco Depression Prevention Research Project: A Randomized Trial with Medical Outpatients | Selective/ N=150 | Depressive symptoms, medical problems, low income, minority status in public primary care setting | Lower levels of depressive symptoms | Muñoz, 1993, 1990, 1987 |
| Projecto Bienestar: An Intervention for Preventing Depression in Hispanic Immigrant Women in the Community | Selective/ N=399 | Low income, immigrant minority status, distress, depressive symptoms | Fewer depressive symptoms | Vega, 1990, 1987 |
| Peer- and Professionally-Led Groups to Support Family Caregivers | Selective/ N=56 | Caregiver burden, anxiety, depression | Lower levels of psychiatric symptoms, including anxiety and depression, better coping skills | Toseland, 1990, 1989 |
| ***Elderly*** | | | | |
| Widow-to-Widow: A Mutual Help Program for the Widowed | Selective/ N=162 | Widowhood, bereavement, depression, anxiety, social isolation | Fewer depressive symptoms, less social withdrawal | Vachon, 1982, 1980, 1979 |

women may decrease developmental risks associated with the onset of many mental disorders.

Interventions with high-risk groups should use the broad definitio prenatal care recommended by the U.S. Public Health Service E Panel on the Content of Prenatal Care (USPHS, 1989). Going beyon traditional guidelines for prenatal care, the panel argued that all p nant women, as a minimum, should receive general information a the physiological and emotional changes of pregnancy as well as growth and development. In addition, they should receive educ regarding positive maternal health behaviors and habits, psychos preparation for childbirth, and education and support for effe parenting and family behaviors (USPHS, 1989). There was sp emphasis on the identification of and intervention for behavior d ders likely to produce child maltreatment and/or family violence.

In 1988 the Institute of Medicine assessed the barriers to ade prenatal care and reviewed 31 intervention programs nationwide, which were selective programs directed at high-risk groups (IOM, 1 Programs studied were categorized according to one of five are major emphasis: (1) reducing financial obstacles, (2) increasing the capacity of the prenatal care system, (3) improving institutional pra to make services more accessible and acceptable, (4) casefinding, ar providing social support. Few of these programs used randomiz techniques or other strong research designs to assess program ef Selection bias, in particular, flawed most evaluations. Moreover cause many of the programs were complex, it was difficult to distin the specific impact of individual elements. The IOM committee cluded that although several types of programs can succeed in bri women into prenatal care and maintaining their participation success of many programs has been modest, often because they become embedded in a complicated, fragmented network of mat services characterized by pervasive financial and institutional obs to care (IOM, 1988). Access barriers were identified in all five categ A significant finding was that casefinding and social support ar most effective means of increasing early and continuing use of pre care and compliance with health recommendations among mo most at risk of absent or inadequate prenatal care (IOM, 1988).

### *Immunization*

Childhood immunization, like prenatal care, is an example universal preventive intervention directed at the entire population though it is given to individuals. Immunization is an example o

traditional public health model—in which each vaccine can confer long-lasting, often lifetime, protection against a specific physical disease. Currently, infants and children can and should be immunized against poliomyelitis, diphtheria, pertussis, tetanus, measles, mumps, rubella, *Haemophilus influenzae* type b (Hib) to protect children from meningitis, and hepatitis B. For example, when children are not immunized for Hib and meningitis occurs, there is the possibility of long-term negative effects on the brain, resulting in neurodevelopmental problems, mental retardation, learning disability, and psychological and behavioral disorders (Plotkin and Mortimer, 1988).

In the United States, widespread vaccination on appropriate schedules has produced a dramatic drop in the number of cases of the previously common childhood diseases, and their associated high mortality, morbidity, and sequelae. These declines are reported at 97 percent or more since the year the maximum number of cases for each disease was reported (Peter, 1992).

The cost-effectiveness of vaccination is well documented (Hinman, 1988). In 1983 the measles-mumps-rubella vaccine program had a cost-benefit ratio of 14:1, leading to a total saving of $1.4 billion (White, Koplan, and Orenstein, 1985). A study of pertussis vaccine showed that $2.10 is saved for each $1.00 spent on pertussis vaccination (Hinman and Koplan, 1985).

Currently, there is an immunization crisis in the United States, signaled by recurrent measles epidemics. Because measles is the most contagious of the vaccine-preventable diseases, its resurgence acts as a sentinel that warns of a breakdown in the overall immunization rates for other diseases. Epidemiological studies find that the source of the problem lies in the failure to achieve adequate immunization rates among children in the first two years of life. Rates are well below the 1990 national objective of 90 percent of children with completed immunizations by the second birthday (Cutts, Zell, Mason, Bernier, Dini, and Orestein, 1992; CDC, 1991). The failures of preschool immunization are most notable in inner-city and minority populations. In the inner-city areas, typically, fewer than 50 percent of the two-year-olds have been appropriately vaccinated, and African-American and Hispanic children are at highest risk (CDC, 1992, 1991, 1990).

In 1991 the National Vaccine Advisory Committee identified four major reasons for the low immunization rates among preschool children: (1) missed opportunities for vaccination, (2) deficiencies in the public health care delivery system, (3) lack of access to care, and (4) inadequate public awareness of the importance of immunizations. To ensure that immunizations reach all high-risk groups, specially de-

signed selective interventions may be needed. These interven should take the above problems of access into account.

### Programs Aimed at Improving Parenting and Reducing Risks for Infants

In addition to the universal, widely implemented programs discussed, there are some specific, experimentally designed preve interventions targeted at infants and their families. The **Prenatal/ Infancy Project* is an example of a comprehensive program intend prevent a wide range of maternal and child problems often assoc with poverty (Olds, Henderson, Tatelbaum, and Chamberlin, 1986). It is a selective program targeted to a high-risk geographical with high rates of poverty and child maltreatment, in the semi Appalachian region of New York. The sample consisted of 394 wo most of whom were white, who entered the program at no later th weeks of pregnancy. At registration, 47 percent were 19 years o younger, 62 percent were unmarried, and 61 percent were fron lowest socioeconomic group. Violence, drug abuse, and alcoh were common. Many women reported having been abused as chil

The specific goals were to reduce the mothers' prenatal he damaging behaviors, enhance parenting skills, give social suppo mothers, encourage the use of existing community resources, hel mothers achieve desired educational and occupational goals, and re unwanted or inappropriate additional pregnancies. Olds expected these objectives for the mothers could be attained through a home v visitation program. He also expected highly desirable outcomes fo children, including reduction in prematurity and low birthwe decreases in accidents and infectious diseases, improvement in c tion and language development, decreases in psychological and b ioral problems, reduction in child abuse and neglect, and facilitati healthy growth and nutrition.

The intercorrelated nature of the biological and psychosocial fa were also recognized. As previously stated, unwed and teenage r ers are at greater risk of having low-birthweight and premature ba There is increasing understanding that the established higher likeli of adverse developmental, learning, and behavioral outcomes for birthweight and premature babies is largely mediated by ad childrearing factors, such as poorly educated parents, poverty, isol of the family, and a stressful environment (Rose, Feldman, Wallace, and McCarton, 1992; Sameroff and Chandler, 1975).

The intervention was a randomized clinical trial. Women were

y assigned to one of four groups: (1) developmental screening of hildren at one and two years of age and referral for services, (2) lopmental screening and transportation to well-child care clinics, ome nurse visitation during pregnancy, and (4) home nurse tion during pregnancy and until children were two years old.

e program design was conceptually based on the "ecological" el (Bronfenbrenner, 1979), which posits interdependence among l systems that operate simultaneously at the level of the marital and nt-child dyads, the family as a whole, and the larger socioeconomic nces of the community. The intervention strategy relied on home e visitation during critical phases of the life cycle of a family—nancy and the first two years of the infant's life. The home visits, h the mother's primary support person was encouraged to attend, biweekly at first and tapered off to every six weeks by two years of

e design of the program permitted evaluation of the relative effects ecific elements of intervention for both the whole sample and those ets defined as being at risk. For the evaluation of the postnatal omes, groups 1 and 2 were combined into one control group for oses of analysis and compared with group 4 as the experimental ition, referred to here as "nurse-visited." It was found that during nancy, nurse-visited mothers made better use of medical and other al services than the control group. The nurse-visited mothers ienced greater social support, improved their diets more, and ced their cigarette smoking. The greatest impact on infant's birth-ht and mother's length of pregnancy was for nurse-visited young gers. They had a 75 percent reduction in preterm delivery. For the en who were at highest risk (poor, unmarried, and teenage), there a reduction in the incidence of verified cases of child abuse, a drop 19 to 4 percent among those who were nurse-visited (Olds and nan, 1990). (For outcomes with the mothers, see the discussion in ction below on interventions for adults.)

fortunately, community-level implementation of the Prenatal/Early cy Project by one public health department was unsuccessful (see 1.1 in Chapter 11). The program is now, however, being replicated lds in an urban area in another part of the country with a different risk group, minority mothers, to test the generalizability of the vention.

an intense 10-day selective preventive intervention program, the *ile/Kinesthetic Stimulation* study, Field and colleagues demonstrated ive outcomes for preterm, low-birthweight babies (Field, Schan- Scafidi, Bauer, Vega-Lahr, Garcia et al., 1986). In a randomized

controlled trial, the infants who received tactile, kinesthetic stimulation gained significantly more weight—47 percent more per day—than infants in the control group. The infants in the intervention group also were alert and awake more during the awake/sleep behavioral observation, scored significantly higher on the Brazelton subscales of mature habituation, orientation, motor, and range of scale behavior, and were hospitalized significantly fewer days after the onset of the intervention period. This last outcome has positive implications for benefit-cost analyses.

In the **Early Intervention for Preterm Infants* study, Field and colleagues had targeted preterm neonates whose mothers were African-American, unmarried, less than 19 years of age, and of low socioeconomic status based on education and occupation (Field, Widmayer, Stringer, and Ingatoff, 1980). The selective preventive intervention, which consisted of home visits by a two-person team—a trained interventionist and a teenage African-American work study student—aimed to prevent developmental delays in the infants by teaching mothers about caretaking practices and enhancing parent-infant interactions. At four months, the infants who had been randomly assigned to the intervention group had significantly better weight and length and higher scores on the Denver Developmental Screening test. At eight months the results still held, with the intervention infants exhibiting significantly higher mental scores on the Bayley Scales of Infant Development. Additionally, these infants had significantly lower blood pressures.

The **Infant Health and Development Program* is a selective preventive intervention focused on preventing or reducing the health problems, developmental disabilities, and learning and behavioral problems associated with low birthweight (Infant Health and Development Program, 1990; Kraemer and Fendt, 1990). This eight-site randomized clinical trial was designed to evaluate the efficacy of a multicomponent program consisting of pediatric care, child development activities, and family support services. It is a good example of the use of a multicenter clinical trial design applied to research in human development. It is also a well-designed prospective study that illustrates the feasibility of applying a standard comprehensive intervention in diverse community sites.

This kind of ambitious multisite design was desirable and ready to be tested because a number of previous small studies had demonstrated the efficacy of early intervention for improving the developmental, cognitive, and behavioral outcomes for low-birthweight babies. These previous studies, however, were limited by small numbers of subjects at single sites and lack of long-term follow-up. There was, nevertheless,

education and with high-quality center-based infant day care to adopt those materials as curricula for the multisite program. Thus, building on the previous studies, the multisite intervention was designed as the first intervention for low-birthweight babies to include both home visitation and center-based components.

A total of 985 infants, each with a birthweight of 5½ pounds (2,500 grams) or less and a gestational age of 37 weeks or less, participated in the study. Two birthweight groups of the 985 infants were defined to assess possible differential responses: heavier babies (weighing 2,001 to 2,500 grams) and lighter babies (weighing less than 2,000 grams). Within each weight group, one third of the subjects were randomly assigned to an experimental group, and two thirds to a control group. The experimental and control groups both received the same high-quality pediatric surveillance, which included periodic medical, developmental, and social (family) assessments, with referrals for services as needed. The experimental group received two additional components: (1) Home visits by educators to teach parents about the specialized, curriculum-based child development activities they were to administer, and also to supervise curriculum-based problem solving by the parents for self-identified problems. The home visits were weekly during the baby's first year and biweekly until 36 months. (2) Participation by the children in a center-based child development program from the ages of 12 to 36 months for teacher-administered, curriculum-based developmental activities five days per week. Transportation to and from the center was provided. In addition, parenting groups met bimonthly for education and support.

The major finding was that the experimental group achieved significantly higher cognitive scores than the control group at 36 months of age (correcting for prematurity). There was also a marked difference in the response of the heavier and the lighter babies to the intervention. For the heavier babies, the IQ scores in the experimental group were, on average, 13.2 points higher than in the control group. For the lighter babies, results were also positive and significant, but not as great. The IQ scores were 6.6 points higher in the lighter-weight experimental group than for their control counterparts.

For the total control group, both heavier and lighter babies, over 18 percent had IQ scores below 70 (the mental retardation range), and almost 50 percent were below 85. The intervention was not effective for any of the study infants with birthweights of 1,500 grams or less. In this lowest-weight group (used only for analysis purposes), there was virtually no difference between the experimental and the control groups in the proportion who tested at IQ of 70 or below.

There were small but significant intervention effects at age 36 m in behavioral competence. The intervention had a positive effect, cially with infants of mothers with low education levels. Mothers intervention group reported that there were fewer serious beh problems but more minor problems.

Longer-term follow-ups have been planned, and results pertain academic achievement and behavioral problems in school will be able soon as a measure of the durability of the effects of this infanc early childhood intervention. This carefully designed program wil be scaled up into larger field trials by the Centers for Disease C and Prevention, with support from The Robert Wood Johnson Fo tion. The issue of program effectiveness will be a high priority.

Horacek and co-workers demonstrated the utility of early continued intervention to prevent developmental delays and pr academic success among children at risk by virtue of economi social deprivation (Horacek, Ramey, Campbell, Hoffman, and cher, 1987). In the **Carolina Abecedarian Project*, they random signed socially and economically deprived children at infan experimental or control groups. A composite of risk indic including low level of family education, low family income parental and sibling IQ, and evidence of family psychopatholc social maladaptation, was used to identify children at risk for s failure. The intervention included (1) year-round, center-base day care for children beginning at 8 to 12 weeks of age and conti until kindergarten entry, (2) a toy-lending library to permit cont of learning from center to home, (3) a home visitation program, a parent group meetings. At kindergarten entry, 96 of the origin subjects were randomly assigned again to school-age experin and control conditions, which continued for three years. This c allowed comparison of the effects of early versus late versus com intervention on children's cognitive and social development. children received both the preschool and the school-age interve some received only the preschool or the school-age interventio some received no intervention.

The intervention significantly reduced the number of children r ing a grade in school, and it improved the children's test sco reading and math. Effects were greatest for children who receive the early and the school-age intervention phases. In spite of the fa the children came from environments predictive of academic f they achieved a rate of advancement to the next grade nearly ec that of an average-risk comparison group constituted for the stud children who received only one intervention phase, those who re

the preschool intervention performed better than those who received the school-age intervention.

### Evidence from a Quasi-Experimental Study

The *Family Development Research Program* served a poor, predominantly African-American sample of 108 families with incomes of less than $5,000 in which mothers had less than a high school education and a history of semiskilled or unpaid work (Lally, Mangione, and Honig, 1988). Over 85 percent of the participating families were single-parent, female-headed households. This selective study retained a large proportion of families; thus differential attrition was not a major threat to its conclusions.

The multicomponent intervention was provided from the last trimester of the mother's pregnancy through age five for the child. The intervention included a weekly home visit by a "child development trainer" who sought to serve as a friend and advisor on important family issues. The home visitor sought to foster a positive, supportive mother-child relationship, encouraged the family to take an active role in the child's development, and helped the family make contacts with local service agencies. In addition, child care and early educational enrichment were provided in a community center for children from six months to five years of age.

A 10-year follow-up study revealed that children who participated in the intervention had less involvement with the juvenile justice system than did the comparison group (6 percent versus 22 percent), and when they were involved with juvenile justice, their delinquent behavior was less serious. In addition, there were positive effects on school achievement, but these were for girls only (Lally, Mangione, Honig, and Wittner, 1988).

Unfortunately, the study used a quasi-experimental design. The matched comparison group was constituted when subjects were three years old, so obviously there was no random assignment to groups. Such a design prevents the elimination of many alternative hypotheses regarding sources of observed group differences.

### An Example from Prevention Services

*Healthy Start in Hawaii,* a selective intervention program for families at risk of child abuse, is similar in concept and content to the Prenatal/Early Infancy Project described above. Healthy Start, however, was initiated by the Maternal and Child Health Branch of the Hawaii Health Depart-

ment in 1985 not as a research project but as a statewide service project. In 1990 the U.S. Advisory Board on Child Abuse described the program as "clearly the star" of U.S. home visitation programs (U.S. Advisory Board on Child Abuse and Neglect, 1990).

Healthy Start registers pregnant women and mothers with babies up to three months old and serves them until the child is five years old. It uses 15 selection factors to screen for at-risk status. In 1992, Healthy Start was screening 55 percent of the population, and by 1995 it expects to screen 90 percent. About 20 percent of those screened are found to be at risk.

Program elements include early identification of at-risk families, community-based home visiting by laypersons (not nurses as in the Prenatal/Early Infancy Project), linkage to primary health care services and a "medical home," and linkage and coordination with community services. The goals of the program are to provide (1) adequate prenatal and primary well-child health care; (2) quality child care in infancy and early childhood; (3) parental competence and promotion of child development through parent education, infant stimulation, home visitors, and social support; (4) links to medical and community services and (5) continuity of funding so that clients and providers both experience reliability of service provision.

Since the inception of the program, the rates of child abuse and neglect in Hawaii have been slowly decreasing, but it is impossible to determine how much of this is due to the program. A rigorous evaluation is needed. Such an evaluation should provide a detailed analysis of the screening factors that best detect high risk, the implementation, cost-effectiveness, and the child outcomes, including developmental progress, language proficiency, school readiness, and an array of behavioral outcomes, as well as data on rates of child abuse and neglect. However, the ideal way of determining program effectiveness would be a randomized controlled trial with multiple outcome measures.

## Findings and Leads

On the basis of the review of interventions for infants, the following points emerge:

- Infants born to high-risk mothers and children at high risk of not being immunized could benefit from preventive interventions that reduce financial, institutional, and other access barriers.
- Home nurse visitation can be an effective means of influencing

maternal and child outcomes. In some programs, it may be most effective with the at-risk mothers who are the hardest to reach and most distrustful and may have relatively little effect on mothers who are not at risk.

- Provision of intensive and prolonged center-based early childhood education, combined with home visitation to families, can prevent cognitive developmental delays and academic failure in children at risk.
- It is possible to adhere to a rigorous protocol for a complex, comprehensive human development study across several sites that show great diversity in their characteristics. Even with rigorous protocols, appropriate care in implementation can lead to low attrition rates and positive responses from the participants.
- Highly regarded service programs, such as Healthy Start in Hawaii, can be mined for useful leads on which to base more rigorously designed research studies. Such studies could provide more powerful evidence regarding the outcomes of the programs and could improve the effectiveness of these preventive services.

## INTERVENTIONS FOR YOUNG CHILDREN

During early childhood, two examples of important developmental tasks that must be achieved to lower risk for adverse mental health outcomes are (1) the acquisition of language skills to prepare the child to read and write and (2) the development of impulse control (Hawkins and Catalano, 1992). Achieving these tasks has a significant benefit for the ongoing social and cognitive development of the child. Failure at these tasks has been associated with later behavioral and school maladjustment, as well as with the development of mental health problems (Hawkins and Catalano, 1992).

Recent preschool preventive interventions have addressed several risk factors that are related to these developmental tasks, as well as to the development of mental and behavior problems. Risk factors and precursor symptoms that have been addressed in promising interventions during childhood include economic deprivation, poor family management practices, cognitive or developmental delays, school failure, and early behavior problems.

Prevention efforts that address these risk factors during early childhood have adopted a number of approaches, including (1) center-based early childhood education, in which preschool programs are designed to enhance social competence and cognitive development; (2) home visitation to provide a variety of support and educational services; (3) parenting training and education to teach skills in caregiving and

effective behavior management; (4) family support services, which provide survival-focused support; and (5) policy initiatives that address issues of child safety, health, and education. Most programs have combined two or more of these approaches in multicomponent interventions.

Dramatic increases in the proportion of children living in poverty have stimulated research on the developmental outcomes associated with growing up in poverty. As mentioned above, children from poor families are at heightened risk for mental health problems, as well as other problem behaviors (Farrington, Loeber, Elliott, Hawkins, Kandel, Klein et al., 1990). The risk poor children face has been addressed in two ways. First, poverty has been used as a selection criterion in choosing target populations for early childhood intervention. Second, some programs have directly addressed the financial, housing, and other economic needs of poor families in addition to addressing the child's risk for later problems (e.g., Infant Health and Development Program, 1990; Lally, Mangione, and Honig, 1988; Lally, Mangione, Honig, and Wittner, 1988; Andrews, Blumenthal, Johnson, Kahn, Ferguson, Lasater et al., 1982). Virtually all the programs reviewed in this section have focused on reducing risk for children raised in poverty.

### Programs Aimed at Improving Parenting and Enhancing Child Development

Multicomponent programs that add center-based child care and early education to their parenting components can be introduced at this phase of development as well as during infancy. The **Houston Parent-Child Development Center* program provides another example of the effectiveness of these augmented approaches (Johnson, 1991, 1990; Johnson and Walker, 1987). The Houston Parent-Child Development Center recruited Mexican-American families in poverty who had one-year-old children with no neurological impairments or chronic illnesses. Because mothers were required to participate extensively, the project did not include families whose mother's employment might interfere with their participation. Eligible volunteers recruited from door-to-door surveys were randomly assigned to experimental or control conditions.

The two-year selective preventive intervention included 20 to 30 home visits of 1½ hours duration during the first year, which focused on mother-child interaction, recognized the child's developmental status, and used the home as an environment for learning. In addition, four weekend workshops were offered on special topics to ensure participation of fathers, 90 percent of whom were present in participating families.

During the second year, children attended nursery school four mornings per week, and mothers attended three-hour classes at the center four mornings per week for eight months. Class topics included home management (including health and budgeting) and child development and management issues. Monthly evening sessions for mothers and fathers were offered on special topics, including sex education, family planning, and driver education. The center explicitly sought to serve as a support system for participating mothers and families. Cultural relevance and bilingual format were included in the program design.

At 36 months, mothers showed significantly positive effects of the program. They used more praise and less criticism, and there was more positive mother-child interaction. Few differences were observed in children's behavior during the preschool period, but at follow-up, when children were aged 8 to 11 (in grades 2 to 5), intervention children were rated by teachers as more prosocial and engaging in less acting out and problem behavior, including less impulsive and disruptive behavior and less fighting. The program did not affect measured intelligence.

Overall, this intervention made extensive time demands on mothers. Approximately 550 hours of family participation was expected. Unfortunately, about half of the intervention participants had left by the end of the program, in part because of the high mobility of the Mexican-American families in the sample and also perhaps because full participation consumed so many hours that it almost completely prevented the mother from having a job. This high attrition rate presents a major difficulty in evaluating program effectiveness, which perhaps could have been avoided had these cultural and logistic issues been considered.

The **Mother-Child Home Program of Verbal Interaction Project* targeted economically disadvantaged, single mothers of low educational attainment who had two-year-old children (Levenstein, 1992; Madden, O'Hara, and Levenstein, 1984). The selective preventive intervention design involved trained home visitors (either paid paraprofessionals or unpaid volunteers), who visited mothers and their children twice per week for 30 minutes when the child was aged two to four. Home visitors followed cognitive curricula that employed books and toys. They played with the child and mother together, modeling the verbal curriculum and helping the mother to improve her skills to enhance the child's development. Visitors were trained to involve the mother and to pull gradually away from the interaction, allowing the mother and child to play together. On average, more than 35 visits were made each year to intervention families.

Compared with evaluation-only and control groups, the experimental group of children improved significantly in IQ at two-year follow-up

and scored significantly better on achievement and IQ tests in grades 5 and 8. The investigators found evidence of improvement in maternal childrearing behavior, including verbal interaction, following the intervention. Improvements in the mother's childrearing behavior by the time the child reached age four were linked to the child's later positive classroom attitudes and behavior as rated by first-grade teachers. Moreover, younger siblings of intervention children entering the program in later years had significantly higher IQ scores (by eight points), suggesting the possibility that what the mother learned about parenting enhanced the cognitive development of her younger children also.

As in many field studies, influences other than the intervention affected the outcomes. For example, 94 percent of the parents in the experimental group and 75 percent of the parents in the control group reported that their children attended preschool programs after the intervention. These programs may have affected performance in grades 5 and 8. A low rate of acceptance (52 percent) by those who were offered an opportunity to be in the study may have introduced self-selection. In addition, the subject randomization process used in later years of the study also may have introduced self-selection of more highly educated and intelligent mothers into the study sample. Nonetheless, this multiyear intervention study indicates the promise of a home-delivered curriculum focused on improving maternal skills to facilitate the cognitive development of the child.

Parent-child interaction has also been targeted during early childhood through indicated preventive interventions. Strayhorn and Weidman (1991) reported the results of a study, **Parent-Child Interaction Training*, in which low-income parents who identified one or more behavioral problems in their children were recruited from Head Start and other sources. They were randomly assigned to the experimental or the control group. Participants were 64 percent African-American, and a majority were single female heads of household. Over 41 percent of the mothers evidenced mild or greater depression on the Beck Depression Inventory. Parents in the experimental group were offered four to five two-hour group sessions with instruction and role playing on parenting skills, including behavioral management. They were also trained in play and conducted individual play sessions with their children, attending sessions until they reached "criterion."

Although parental participation in the intervention varied, group comparisons at one-year follow-up revealed significant improvements in experimental subjects when compared with controls on teacher-rated attention deficit/hyperactivity and on behavior as rated by teachers on the Behar behavior questionnaire. Again, analyses suggested that im-

proved parenting practices following intervention predicted better child outcomes one year later. Conclusions are limited by attrition, the absence of baseline data for the experimental and control children, and some changes in patterns of significant findings from posttest to one-year follow-up. Nevertheless, these results suggest the promise of interventions aimed at enhancing parents' skills in behavioral management and in verbal interaction with their children during prosocial play when such interventions are offered to economically deprived parents of children evidencing early behavior problems in the home.

Other programs have aimed at helping children develop the skills to meet the demands of schooling. Many of these center-based programs have also included parent-focused components such as home visitation. In the **High/Scope Preschool Curriculum Comparison Program* (Weikart, Schweinhart, and Larner, 1986), the highly structured Distar model (a programmed learning approach wherein the teacher initiates activities and the children respond (Carnine, Carnine, Karp, and Weissberg, 1988)), the child-directed experiential approach of the High/Scope Cognitive Curriculum (Hohmann, Banet, and Weikart, 1979), and the nursery school program based on psychoanalytic theory produced similar improvement in cognitive performance through age 10 when combined with educational home visits by teachers. Differences in long-term effects on behavior were found as a function of the curriculum approach that was adopted (Schweinhart and Weikart, 1992). Subjects exposed to the Distar teacher-led, programmed-learning approach were twice as likely as subjects in other early childhood education groups ($p < .05$) to report involvement in delinquent acts (e.g., violence, drug abuse, and status offenses) at 10-year follow-up (when they were age 15). The effect size for the overall delinquency score ranged from 0.48 to 0.60. This difference was attributed by the investigators to the fact that the Distar program, which was primarily academic, gave little attention to the social behavior of the children, whereas the two other curriculum approaches did.

The **Perry Preschool Program* used the High/Scope curriculum and focused on enhancing the intellectual and social development of three- and four-year-old African-American children from backgrounds of extreme poverty. The selective preventive intervention, begun in 1962, consisted of daily participation in preschool over a one- to two-year period and weekly home visits by trained teachers. The experimental intervention was associated with positive effects on academic performance and social adjustment when randomly assigned experimental and control subjects were followed up and compared at age 19 (Berrueta-Clement, Schweinhart, Barnett, Epstein, and Weikart, 1984). Atten-

dance in the Perry Preschool Program was associated with a lower rate of deviant behavior and greater social competence in adolescence and early adulthood (Schweinhart, 1987). In primary school the Perry Preschool children demonstrated lower rates of aggression, disobedience, disruptive behavior, lying, stealing, and profanity (an average of 2.3 offenses per person, compared with 3.2 for the no-preschool group). At age 15 the Perry Preschool group reported fewer acts of misconduct, and at age 19 they reported fewer violent acts and less police contact (an average of 1.2 arrests per person, compared with 2.3 for the no-preschool group). Only 31 percent of the preschool group had been arrested at least once by age 19, compared with 51 percent of the no-preschool group. By age 19, experimental preschool participants had lower arrest rates and fewer lifetime arrests, as well as lower rates of self-reported fighting, than control subjects. They also had higher rates of secondary school completion, lower rates of placement in special education classes, and higher grade point averages than their control counterparts (Berrueta-Clement et al., 1984).

### Programs Aimed at Enhancing Social Competence

The evidence linking aggression and other behavior problems in childhood with increased risk of later mental disorders has led to the development of educational strategies designed to enhance the social competence of youngsters. These interventions are based, in part, on the hypothesis that aggressive and disruptive children are deficient in basic, teachable, interpersonal skills (Spivack and Shure, 1974) and that acquiring these skills can reduce the risk of childhood psychopathology and later mental disorders.

Social competence interventions seek to enhance children's capacities to coordinate cognition, affect, and behavior so that they can respond adaptively to social tasks and challenges (Weissberg, Caplan, and Sivo, 1989). These interventions have focused on four skill areas: (1) self-management or self-control, (2) communication, (3) decision making and problem solving, and (4) resisting negative and limiting social influences.

One of the original programs to enhance social competence, Shure and Spivack's **I Can Problem Solve: An Interpersonal Cognitive Problem-Solving (ICPS) Program,* was targeted to economically disadvantaged four- and five-year-old African-American children from federally funded Head Start day care centers and kindergarten classrooms in inner-city Philadelphia. The curriculum includes a manual of scripted lessons of games and interpersonal dialogues provided daily for 20 minutes over a

three- to four-month period. It also includes 10 to 12 lessons that introduce the language and basic concepts for thinking about alternative solutions to problems and about the consequences of actions, approximately 20 lessons that teach children to recognize and be sensitive to the feelings of others, and approximately 15 lessons teaching problem-solving processes for generating several possible solutions in a social situation and thinking about the likely consequences of each solution. Each lesson is delivered to small groups of nursery school or kindergarten children by a classroom teacher trained in the curriculum. Teachers are taught an important informal communication method called "problem solving dialoguing" to provide children with opportunities to use their new skills in social situations arising in the classroom or on the playground.

In testing the curriculum, Shure and Spivack chose not to restrict the intervention to children who were already showing skills deficits, but rather to provide it to all urban children from families in poverty attending intervention day care centers and intervention kindergartens, thus making it a selective preventive intervention.

A complicated design, small numbers, and substantial attrition (39 percent lost in year two) hampered the study. Nevertheless, the results provided empirical support for the efficacy of enhancement of social competence through training in interpersonal problem-solving skills at ages four and five in urban day care and school settings. Shure and Spivack (1988, 1982, 1980) reported that social competence training produced durable effects on social behavior. Children trained in nursery school were rated as significantly better than untrained controls on measures of adjustment at the end of the intervention and again one year later when rated by kindergarten teachers. These effects were observed in those at highest risk. For children trained in kindergarten, 70 percent of those previously rated as impulsive were rated as adjusted, compared with 6 percent of the impulsive controls. The investigators showed that acquisition of skills to generate alternative solutions and consequential thinking skills predicted behavioral adjustment at post-test.

The results suggest that providing a social competence curriculum to inner-city disadvantaged children before first grade can help to reduce aggressive and socially inappropriate behaviors predictive of later mental health problems. By the spring of kindergarten, only 30 percent of children in control classrooms were rated by their teachers as normally adjusted, compared with 77 to 85 percent of the children in the three experimental groups exposed to different lengths and combinations of intervention at ages four and five.

The investigators had first conducted a pilot test of the use of the ICPS curriculum by inner-city African-American mothers in poverty (Shure and Spivack, 1982). Twenty mothers of four-year-old children who showed observable behavioral difficulties in nursery school and 20 matched controls were studied in an indicated preventive intervention. The findings demonstrated that mothers could be trained to teach their children ICPS lessons at home. Children in the experimental group improved significantly more than controls on measures of interpersonal skills and behavioral adjustment. Moreover, the improvement in behavior generalized to the classroom, as reflected in teacher ratings of behavioral adjustment.

### Findings and Leads

- Multicomponent interventions that address multiple risk factors have proved effective in improving the family management practices of low-income parents and in facilitating the cognitive and social development of children of low-income, low-birthweight, and low-education backgrounds, preparing them for successful entry into the primary grades. There is also some evidence that multicomponent early childhood interventions have shown effects in promoting prosocial behavior and preventing behavior problems.
- Preventive interventions designed to enhance social competence through teaching interpersonal problem-solving skills at ages four and five in urban day care and school settings and through parents training their children in these skills at home have produced durable effects on conduct problems in children.
- Early childhood interventions can have positive long-term effects on academic performance and social adjustment. Achieving enduring effects through adolescence, a period of great risk for onset of mental disorders, by intervening in early childhood is a noteworthy possibility.
- All of these early childhood interventions are characterized by intensity. In most of the programs, services were provided daily over periods of several years, often involving frequent visits to families' homes. All of the effective early childhood programs reviewed here recognize the role of parents in the continuing development of children, and all involve parents on some level, whether through home visitation or center-based programs. All of the programs worked to involve parents in supporting the cognitive and behavioral development of their children. Some provided parents with supports for handling financial, housing, and other material problems as well. These successful interventions typically involved multiple intervention components focused on multiple risk factors for later disorders.

- Early childhood interventions, delivered with fidelity and quality, clearly can reduce risks for later disorders in children from at-risk families. Data are not yet available regarding the effects of these early childhood interventions on the incidence of a wide range of diagnosable disorders, including, but not limited to, substance abuse disorders, conduct disorder, depressive disorders, and schizophrenia.

## INTERVENTIONS FOR ELEMENTARY-AGE CHILDREN

Middle to late childhood (ages 5 to 12) is a period of rapid cognitive and social development. Most children learn to read and to interact in ways that gain social approval from peers during this period. Children who cannot perform academic tasks at grade level by grade 4 and/or who develop social incompetence, impulsivity, and aggressive behavior during this period are at high risk for developing mental disorders, especially substance abuse, conduct disorder, and depressive disorders.

In addition, the family environment may contribute to risk during this period. Poor parenting practices, high levels of conflict in the family, and a low degree of bonding between children and parents appear to increase the risk for mental disorders.

Preventive interventions at this period have focused on the children, with less attention to parents. The children, now developmentally more advanced, are capable of engaging in more verbal interventions. High-risk factors for children, including early behavior problems, have been addressed through enhancement of social competence and academic achievement. Intensive family preservation services have provided crisis intervention for families where children are at risk for out-of-home placement.

### Programs Aimed at Enhancing Parenting Skills and Family Functioning

Universal interventions seeking to enhance parenting skills, such as courses on parenting complete with books and video tapes, have been popularized over the past two decades. Unfortunately, virtually no controlled studies have examined the effects of these relatively widely disseminated programs, either in terms of risk reduction or in terms of the prevention of mental disorders or related health and behavior problems. A number of experimental treatment studies, however, have demonstrated the effectiveness of parenting skills training during early and middle childhood to reduce antisocial behaviors in children meeting

McMahon and Wells, 1989; Fraser, Hawkins, and Howard, 1988; Kazdin, 1987; for reviews.)

### An Example from Prevention Services: Family Preservation Services

In a related but separate area, public and private providers of children's services have initiated intensive family preservation services for families whose children are at risk for out-of-home placement. These short-term crisis interventions are delivered to families in their homes toward the goal of stabilizing the family—by improving family functioning and linking the family to sustaining sources of support—to the point that out-of-home placement of the child is not necessary. These programs are both a response to evidence that out-of-home placement is predictive of more negative social, health, and mental health outcomes and therefore is a risk factor for mental disorders and a response to the rising costs of foster care, congregate care, and institutional care for children removed from their families. Reducing the risk of out-of-home placement might reduce the subsequent onset of mental disorders.

The *Homebuilders Program* in Tacoma, Washington, pioneered the development of intensive family preservation services. In programs based on the Homebuilders model, workers deliver a variety of clinical and material services in the home setting. The services are of short duration (90 days or less) and intensive (a minimum of 8 to 10 hours of face-to-face client contact per week). The mental health status of the parents and children is not assessed.

Early uncontrolled evaluations of intensive family preservation services reported significant cost savings resulting from avoidance of out-of-home placements (Kinney, Madsen, Fleming, and Haapala, 1977), stimulating legislative and administrative interest in the intervention. Currently, intensive family preservation services are being implemented in child welfare, juvenile justice, and mental health systems.

The most rigorous evaluation of intensive family preservation services was a New Jersey study in which 214 eligible families were randomly assigned to family preservation services using the Homebuilders model or to a control group that received existing community services (Feldman, 1991a,b). In spite of an attempted random assignment, there was a significantly higher percentage of whites in the family preservation group (51.3 percent) than in the control group (33 percent). Excellent implementation data indicate that the intervention was conducted in accordance with the Homebuilders model. Both experimental and control groups were at risk for out-of-home placement; just under 20

percent had experienced a prior out-of-home placement. Over 86 percent were from poverty. Most were referred as a result of the child's out-of-control behavior; one quarter were referred because of abuse, neglect, or risk thereof.

At the termination of this intervention, children had entered placement in only 6 percent of experimental families, compared with 16.5 percent of control families. A series of comparisons suggest that families receiving preservation services functioned better than control families when the intervention ended, an indication that the services had improved social support systems for families, reduced family conflict, and strengthened family bonding. The difference in the percentages of children entering placement from experimental and control families persisted over time through multiple follow-ups to 12 months after termination, at which time placement rates were 42.7 percent for the experimental group and 56.7 percent for the control group. These results suggest that even though intensive family preservation services are effective in avoiding some out-of-home placements in the short-term, their long-term results are less impressive.

### Programs Aimed at Enhancing Social Competence

In the **Assertiveness Training Program,* a universal preventive intervention, Rotheram, Armstrong, and Booraem (1982) trained college students to lead assertiveness training sessions with a sample of 60 percent white, 35 percent Chicano, and 5 percent African-American fourth-, fifth-, and sixth-grade students from predominantly working-class homes in California. An experimental study comparing assertiveness training against a placebo control intervention demonstrated effects at one-year follow-up on both social competence and academic achievement. In addition to this universal program, an indicated preventive intervention study was done with 101 children targeting four groups: underachievers, disruptive students with conduct problems, children with multiple problems related to achievement and conduct, and exceptional children without major problems. In this study, effects appeared to be least strong among children evidencing multiple problems at baseline (Rotheram, 1982).

Social competence components also have been included in interventions designed for populations selected for intervention because of exposure to specific risk factors or stressors during childhood, including parental divorce, parental substance abuse, and parental depression.

Children from homes broken by marital discord are at risk for conduct disorder and substance abuse disorders (Baumrind, 1983; Penning and

Barnes, 1982; Robins, 1980). Pedro-Carroll and Cowen (1985), in their *Children of Divorce Intervention Program (CODIP), sought to reduce risk and enhance adaptation among children of divorce. They developed a curriculum of 10 one-hour weekly sessions for children in grades 4 through 6 whose parents had divorced. The curriculum included a component focused on understanding feelings about divorce and divorce-related anxieties, a cognitive skills-building component for resolving interpersonal conflicts, and a component dealing with skills for controlling anger. A team of two trained facilitators led the school-based intervention.

This selective preventive intervention was first tested with children from white middle-class families in four suburban schools. Participants were recruited through letters and phone calls to parents. Parental consent was necessary for participation. Parents of participants had been separated for an average of 23.6 months. Participants were matched by gender, grade, length of time since parental separation, and other preadjustment measures before being randomly assigned to the experimental group or control group that received a delayed intervention.

At posttest, two weeks following program completion, teachers rated experimental participants as being significantly better adjusted than control subjects on two measures of the Classroom Adjustment Rating Scale (CARS)—shy-anxious behaviors and learning problems. Teachers also rated participants as significantly more socially competent at posttest than controls on the Health Resources Inventory (HRI), which includes indicators of adaptive assertiveness, peer sociability, and frustration tolerance. Similarly, experimental children rated themselves as significantly less anxious than controls at posttest. Further, at posttest, parents of intervention children rated them as significantly less maladjusted than did parents of controls on a scale including items on peer relationships, school performance, and feelings about divorce. These findings were replicated in a less rigorously designed study by Pedro-Carroll and colleagues (Pedro-Carroll, Cowen, Hightower, and Guare, 1986).

Alpert-Gillis, Pedro-Carroll, and Cowen (1989) subsequently extended the program to 16 45-minute sessions and tested it with second- and third-grade children in an urban setting. About 31 percent of participating children were nonwhite. The curriculum was revised to reflect the sociocultural population of urban children targeted. Unfortunately, they used a quasi-experimental design; that is, the experimental group was recruited by a different procedure than the comparison group, and there was no random assignment to the two groups. Greater

emphasis was placed on teaching children ways to cope with the problem of infrequent contact with noncustodial parents and to seek support from extended family members and other caring adults. In addition, curriculum materials were selected to portray families of diverse ethnic backgrounds. The definition of divorce was also expanded to include the termination of a common-law relationship or a long-standing live-in partnership if the mother reported a separation. Participants' parents had separated an average of 3.75 years before the intervention.

Pretest comparisons with a group of children from intact families showed both the experimental and the comparison groups of children of divorce were significantly less well adjusted. At posttest, one to four weeks following the intervention, experimental children evidenced significant improvements when compared with comparison groups on (1) self-ratings on the Children's Divorce Adjustment Scale, which assesses coping skills and attitudes toward family, parents, and self; (2) parent ratings of children's feelings, behaviors, and problem-solving skills; and (3) teacher ratings of children's competence, including assertiveness, frustration tolerance, and peer social skills.

The findings from the original study, receiving some support from the second study, suggest that a relatively brief social competence intervention can produce immediate reductions in anxiety, adjustment problems, and behavior problems among both middle-class white children and poor and working-class, urban, multiethnic children who have experienced parental divorce or separation. Longer-term effects of the intervention have not been investigated. The results to date suggest the promise of selective preventive interventions focusing on the enhancement of social competence during the elementary grades for children who have recently experienced parental separation.

Other investigators are also seeking to reduce risk and enhance adaptation of children of divorce (see Grych and Fincham, 1992, for a review; Gwynn and Brantley, 1987; Stolberg and Garrison, 1985; Kalter, Pickar, and Lesowitz, 1984). In addition, Sandler and colleagues, in the **Family Bereavement Program*, sought to improve the mental health of children who had experienced the death of a parent within the past two years (Sandler, West, Baca, Pillow, Gersten, Rogosch et al., 1992). They did this by attempting to enhance the family environment. The intervention group received a three-session family grief workshop and 13 highly structured sessions from a family advisor who had personally experienced a bereavement similar to the deaths experienced by the families. Parent reports indicated that the intervention group improved on symptoms related to depression and conduct disorder, especially for

the older children. This finding suggests the need to target programs to children's different developmental needs.

More targeted social competence interventions have been designed for populations of children with risk factors for later disorders, such as peer rejection or early aggressive behavior. Bierman's (1986) program, **Social Skills Training*, examined the impact of a social skills training program that involved role playing naturalistic interactions between a target child and peer partners. This selective intervention was targeted at 11-year-olds who had low peer acceptance and were deficient in conversation skills. Children were randomly paired with two same-gender peers and assigned to one of two experimental conditions: social skills training or peer experience. On short-term follow-up, the social skills training showed an overall positive effect on conversational skill acquisition and peer response.

Lochman and co-workers tested an expanded social competence curriculum, the **Social Relations Intervention Program*, with a sample of 86 African-American fourth-grade children identified through sociometric ratings as the most socially rejected and physically aggressive in their classrooms and then randomly assigned to intervention and control groups (Lochman, Coie, Underwood, and Terry, in press). The indicated intervention, based on earlier quasi-experimental work (Lochman and Curry, 1986), consisted of positive social skills training to promote prosocial behaviors and cognitive-behavioral training to decrease anti-social reflexive responses and foster adaptive social problem solving. The curriculum included 26 30-minute individual sessions and 8 small-group sessions. It had four components: social problem-solving training, positive play training, group entry skills training, and training on coping with anger (including how to identify and reduce impulsive behavior and how to use self-talk to regulate behavior). Sessions were held twice weekly at school from early October to late April, for a total of 12 to 18 sessions, by a team of psychology graduate students and a university psychologist.

Small samples, nonequivalent comparison groups, and substantial attrition posed threats to this study, but teacher-rated aggression and rejection were significantly lower among a subgroup of rejected-aggressive children who had received the intervention than among rejected-aggressive children in schools not offered the intervention. One year later, for those remaining in the study, significantly lower teacher ratings of aggression and higher teacher ratings of prosocial behavior were observed in the aggressive-rejected subsample. The intervention appeared to have little effect on the behaviors or ratings of rejected children not also identified as aggressive.

Lochman (1992) followed up several of these aggressive boys in a quasi-experimental study of the longer-term effects of the anger-coping curriculum. Thirty-one boys rated by their teachers as aggressive and disruptive in grades 4, 5, and 6 were compared with 52 boys in other schools rated by either teachers or peers as aggressive. The intervention was followed by significant short-term improvements in rates of substance use, general behavioral deviance, and classroom behavior as measured by observational data and self-reports from the two groups. Three years following the intervention, boys exposed to the school-based intervention had lower rates of drug and alcohol involvement and higher levels of social problem-solving skills, although not lower rates of delinquency or classroom behavior problems. However, a subset of 12 who received booster sessions in the year following the original intervention, combined with five parent training workshops, also showed enduring effects on passive off-task classroom behavior three years after the intervention.

Building explicitly on the treatment interventions developed by Patterson and colleagues (Patterson, Reid, Jones, and Conger, 1975), Tremblay and colleagues at the University of Montreal designed a two-year indicated intervention program for disruptive seven-year-old boys, the **Montreal Longitudinal-Experimental Study* (Tremblay, McCord, Boileau, Charlebois, Gagnon, LeBlanc, and Lariveet, 1991). It combined home-based training for parents in family management skills, offered once every two weeks for a two-year period, with social skills training delivered in schools to disruptive boys within small groups of prosocial male peers. Parents received an average of 17 parenting sessions over the two-year period, and 19 training sessions were provided to the children over the same time. Sessions for the children focused on initiating social interaction, improving interpersonal skills, making verbal requests, following rules, handling anger, and mastering "look and listen" techniques for regaining self-control.

A field experiment tested the intervention with a sample of 172 boys from low-socioeconomic areas of Montreal who were assessed by their teachers at the end of kindergarten as highly disruptive. Boys were randomly assigned to one of three groups: experimental (received intervention); observational (received attention but no intervention); and control. Teacher ratings indicated that boys in the experimental group became significantly less aggressive than boys who did not receive the intervention. This difference lasted through the most recently reported follow-up at age 12, three years following intervention. Further, significantly more control boys were retained in a lower school grade or placed in special classes, schools, or institutions. Twice as many control boys (44 percent) as boys in the experimental group (22

percent) were rated as having serious adjustment problems a
Moreover, significantly more control boys had initiated min
quency by age 12 (Tremblay, Vitaro, Bertrand, LeBlanc, Bea
Boileau, and David, 1992; Tremblay et al., 1991).

### Programs Aimed at Enhancing Academic Achieveme

Apparently reciprocal relationships between achievement a
depression have led some researchers to explore interventions
on the promotion of academic achievement as a preventive inte
(Kellam and Rebok, 1992). Similarly, the evidence that poor
achievement predicts both later drug abuse and delinquency (H
Catalano, and Miller, 1992) has led to the investigation of enha
of academic competence as a component of preventive interve

Several intervention studies have focused on the enhanc
academic competence during the elementary grades. The use
methods of instruction in classrooms has been shown in exp
studies to improve achievement. Several studies have linked ach
gains to the amount of active instruction and direct supervision o
provided by teachers (Brophy and Good, 1986). Some interven
have trained teachers in the use of effective instructional
including the use of interactive and "mastery" teaching methods,
teachers frequently monitor students' performance. Teachers a
to use the results of these frequent assessments to adjust instr
provide more intensive support, such as tutoring or cooperative
groups, to increase the academic and cognitive development
dents, including those at risk of poor achievement.

An experimental community-based study, **Community Epide
Preventive Intervention: Mastery Learning and Good Behavior Game*, o
learning methods in first grade in 19 ethnically and sociodemog
mixed public schools in Baltimore, Maryland, found positive
reading achievement (Kellam and Rebok, 1992). Moreover, virtu
the reading gains occurred among students initially showing d
symptoms and among those with initially low reading scores, s
that this universal intervention may have greater benefits for th
for depressive disorders. In addition, the Good Behavior Game
had positive effects on aggressive and shy behavior, with th
effects found for the most aggressive children.

Learning and achievement problems have also been add
tandem with peer rejection through selective interventions ta
children with both risk factors. Individual tutoring has been
produce significant improvements in reading and math ach

among low-achieving, socially rejected fourth graders in **Academic Tutoring and Social Skills Training*, and effects on reading scores remained at one-year follow-up (Coie and Krehbiel, 1984).

Hawkins, Catalano, and their colleagues implemented the **Seattle Social Development Project* with first graders in eight Seattle, Washington, public schools (Hawkins, Catalano, Morrison, O'Donnell, Abbott, and Day, 1992). The initial universal preventive intervention program lasted four years, from the first through the fourth grade. It was a multicomponent intervention and sought to reduce risks in family, school, and peer environments. Although participating schools were chosen on the basis of high crime in their catchment areas (and therefore the intervention might be designated as selective), the program focused on all children rather than on identified at-risk children. One school implemented the program with all students, and one school served as a full control school. The students in the remaining six schools were randomly assigned to experimental and control classrooms. The intervention included teacher training and supervision to modify classroom instruction and classroom management practices in grades 1 through 4, training and supervision of first-grade teachers in the use of Shure and Spivack's (1988) Interpersonal Cognitive Problem Solving Curriculum (see the section above on early childhood), and parent training in grades 1, 2, and 3. Teachers were trained in proactive classroom management, effective instructional methods, and cooperative learning (Hawkins, Doueck, and Lishner, 1988; Hawkins and Lam, 1987). Parents were offered two programs. The first, offered when children were in first grade, was a skills-training program focused on management of children's behavior (Hawkins, Catalano, Jones, and Fine, 1987). The second, "How to Help Your Child Succeed in School," offered when children were in second and third grades, focused on providing parental support for academic development (Hawkins et al., 1987).

Results of assessments were reported shortly after the children entered fifth grade (Hawkins et al., 1992). Fewer children in the experimental group than in the control group reported having initiated delinquent behavior and alcohol use. Children from the experimental group also reported more positive results than control group children for parent management, family communication, family involvement, attachment to family, school rewards, school attachment, school commitment, and achievement tests.

### An Example from Prevention Services: School Reorganization

Academic achievement can also be enhanced through a preventive

*Development Program* was created by Comer and colleagues at the Yale Child Study Center as a demonstration of a prevention service that was evaluated initially by quasi-experimental methods and only later by a randomized controlled trial (Comer, 1985). The organizational development model that was used focuses on broadening the involvement of those who have a stake in the school. It creates a school management team, a mental health team, and a program to encourage and support parent involvement. Parents, teachers, and administrators play active and meaningful roles in all these groups, and the result is an enhanced sense of "ownership" of the school's programs.

The School Development Program was first applied in two inner-city elementary schools serving predominantly low-income African-Americans in New Haven, Connecticut, beginning in 1968. Comer (1988) reported positive gains in student academic achievement and in standardized reading and math tests compared with national norms over a 12-year period after implementation of the program. A follow-up study of children from intervention schools and a matched comparison group found higher reading and math scores, school grades, and social competence scores among the children in the intervention schools (Cauce, Comer, and Schwartz, 1987). After further testing with increasingly more rigorous design, the School Development Program is now being used in more than 100 schools throughout the country, and The Rockefeller Foundation has awarded funding for national dissemination of the intervention. A randomized controlled study of the intervention, supported by the MacArthur Foundation, is currently under way in Prince Georges County, Maryland (Jessor, 1993). Such a rigorous design is especially difficult in community intervention of this scale, but the study may yield valuable information regarding the efficacy of the intervention.

### Evidence from Quasi-Experimental Studies

Elias and colleagues extended and elaborated on Shure and Spivack's (1988) Interpersonal Cognitive Problem Solving Curriculum for use with children in grades 4 and 5 to prepare them to handle the transition to middle school more effectively (Elias, Gara, Ubrlaca, Rothbaum, Clabby, and Schuyler, 1986). Quasi-experimental analyses with a sample of white children from predominantly working-class homes suggested some small but lasting effects on indicators of psychopathology six years later (Elias, Gara, Schuyler, Brandon-Muller, and Sayette, 1991).

Interventions to enhance social competence have been included in programs offered in settings beyond the school, including after-school programs for latchkey children (Ross, Saavedra, Shur, Winters, and

Felner, 1992), after-school programs for children in public housing (Jones and Offord, 1989), and programs offered through Boys and Girls Clubs in public housing (Schinke, Orlandi, and Cole, 1992). Nonexperimental results suggest that providing well-designed opportunities for active learning and practice of cognitive, interpersonal, and problem-solving skills to children from economically deprived backgrounds during late childhood and early adolescence in after-school programs might contribute to the development of social competence and reduce behavior problems.

Alterations in teaching methods have been combined with other intervention elements to increase achievement among students at risk by virtue of extreme economic deprivation. In a predominantly African-American school in which 76 percent of the children were eligible for federally funded free lunch, Slavin and colleagues in the *Success for All* program, which had a quasi-experimental design, sought to bring all students up to grade level in reading by the end of third grade (Slavin, Madden, Karweit, Livermon, and Dolan, 1990). The project provided half-day preschool and full-day kindergarten focused on language development, academic readiness, and improved self-concept. In grades 1 through 3, pull-out programs and special education programs were replaced with an intensive interactive reading program supplemented by reading tutoring for students needing extra assistance. In addition, a team of two social workers provided family support, and a parent liaison worker provided parent education and encouraged parents to become involved in the child's education. Two inner-city schools serving predominantly African-American and low-income children were matched. Matched pairs of students from each school at grade levels K through 3 were compared. At the end of one year of intervention, children in the intervention school had higher scores on reading tests, with greatest effects found for students with the lowest 15 percent at baseline. The results were hampered by lack of clarification about how schools were assigned to the experimental and control groups.

### Findings and Leads

- Intensive family preservation services appear to be an effective short-term mechanism for reducing risk of out-of-home placement, stabilizing families in crisis, and developing family competences and supports. However, long-term results are less impressive, and outcome data related to mental health for children and their parents are not available. More rigorous research designs of service programs such as this one could yield valuable information.

- Preventive interventions to enhance social competence for children of elementary age can be effective in reducing early behavior problems predictive of risk for several mental disorders. Whether delivered to whole classrooms of high-risk children or targeted to individual children referred for early behavior problems, social competence curricula have produced significant reductions in early risk factors associated with later onset of conduct disorder, depressive disorders, and substance abuse disorders. Although the evidence is not conclusive, these interventions appear to produce larger and more consistent effects on behavior when begun in the early elementary grades, when followed by booster sessions or offered continuously for more than a year, and when combined with parent training interventions that enlist adult caretakers in more effectively managing child behavior.
- The use of specific instructional methods in classrooms and individual tutoring interventions for low achievers holds promise for reducing academic failure among those at risk for mental disorders. Some selective interventions focused on enhancing academic achievement appear to have the greatest effects with those at greatest risk when subgroups have been analyzed separately (Kellam and Rebok, 1992; Slavin et al., 1990). It is plausible that ensuring the academic success of all children through the use of effective instructional methods in the classroom will reduce academic failure as a risk factor for depressive disorders, conduct disorder, and substance abuse. Unfortunately, few studies have moved beyond short-term follow-ups of effects on risk factors for these disorders.
- Because multiple risk factors have been implicated in the etiology of most, if not all individual disorders, including conduct disorder, substance abuse disorders, and mood disorders, investigators have designed multicomponent interventions focused on reducing risks in several domains (including family, school, and peer environments) by using efficacious risk reduction components. Program results suggest that such designs are highly promising. For example, when guided by a common theory that specifies common aims and principles for a preventive intervention in different domains, teacher and parent training programs offered together can strengthen prosocial involvements and reduce early-appearing health and behavior problems.
- Current preventive intervention research designs, such as those for children of divorce, could be applied to other groups of high-risk children. For example, work has begun in designing and fielding interventions for children of alcoholics (e.g., Springer, Phillips, Phillips, Cannady, and Derst-Harris, 1992; Emshoff, 1990), but these have not yet been well evaluated. Work has also begun with children whose parents

are depressed. Parental depression itself is among the strongest predictors of depression in offspring (Petersen, Compas, Brooks-Gunn, Stemmler, Ey, and Grant, 1993; see Box 6.3 in Chapter 6). Clinical and education interventions for multiple family members based on etiological studies of resilient adolescents exposed to parental depression have been developed (Beardslee, Salt, Porterfield, Rothberg, van de Velde, Swatling et al., 1993; Beardslee, Hoke, Wheelock, Rothberg, van de Velde, and Swatling, 1992; Beardslee, 1990), and rigorous testing of the effects of these interventions on children's behaviors and psychopathology is currently under way.

## INTERVENTIONS FOR ADOLESCENTS

Biological events associated with puberty have come to symbolize the transition from childhood to adolescence. This period between childhood and adulthood has become more prolonged as the age of puberty has decreased in industrialized nations (now beginning for girls on average at age 12½ years) and the entry into full-time productive adult roles has been delayed by educational decisions. Hamburg (1992) has described the developmental risk factors that are associated with adolescence, including the exploratory behavior that is central to early adolescence. For example, children today appear to be at greatest risk for the initiation of substance use and delinquent behaviors indicative of conduct disorder from ages 12 to 15.

The early initiation of delinquent behaviors or substance use has been shown to be strongly predictive of antisocial personality or substance abuse disorders. Thus efforts to prevent conduct disorder and substance abuse disorders during adolescence have focused largely on reducing the incidence of disorders by preventing early onset. Even though the co-morbidity of numerous disorders, including substance abuse, conduct, and mood disorders, has been well established (Elliott, Huizinga, and Menard, 1989; Jessor and Jessor, 1977), the preponderance of research on preventive interventions for adolescents has been disorder-specific, focusing for the most part on the prevention of substance abuse, or to a lesser extent, on the prevention of conduct disorder. Virtually no prevention programs during adolescence have focused on the prevention of depressive disorders or depressive symptoms (Muñoz, 1993a) or schizophrenia, in spite of the fact that the incidence of depressive disorders increases during this period (Petersen et al., 1993) and the initial onset of schizophrenia often occurs in late adolescence. Few prevention studies targeting adolescents have measured the effects of intervention on the incidence of multiple disorders.

Prevention efforts during adolescence have received less attention than have efforts to treat individuals who already have these disorders. Given the disorder-specific nature of much prevention research during this period, it is useful to review interventions that have focused specifically on the prevention of substance abuse or conduct disorder. First, however, a program is presented that focused on academic performance and behaviors more generally.

### Program Aimed at Enhancing Academic Achievement and School Behavior

There is some evidence from the Seattle Social Development Project (discussed in the section on the elementary period above) that, when implemented in middle-school classrooms in grade 7, the selective interventions of teacher and parent training are particularly effective in changing the school behavior of adolescents who are at elevated risk by virtue of low achievement. Hawkins, Doueck, and Lishner (1988), in their study **Changing Teaching Practices*, conducted a selective preventive intervention research program in which seventh-grade students in three schools were randomly assigned to one of 15 experimental or 18 control classrooms. Teachers were also randomly assigned to experimental or control classrooms. One additional school was assigned to be a full control school, and another to be a full experimental school. The intervention included teacher training in proactive classroom management, effective instructional methods, and cooperative learning methods. After one year, the full experimental and control groups were compared (Hawkins and Lam, 1987). A separate investigation focused on intervention effects on low achievers, defined as those students who received a math achievement score in the lower three stanines (bottom 23 percent) on the California Achievement Test in the spring of sixth grade. Although the students from the experimental group did not report different rates of delinquency or drug use, low achievers in experimental classrooms were significantly more attached and committed to school and significantly less likely to have been suspended from school than their control counterparts. This effect was significant only among low achievers, and not in the general population.

### Programs Aimed at Preventing Substance Abuse

The evidence that early first use of substances is predictive of later substance abuse disorder (Kandel, Yamaguchi, and Chen, 1992; Robins and Przybeck, 1985) suggests the goal of preventing, or at least delaying,

initiation in hopes of preventing later abuse. Substance abuse prevention research has focused largely on preventing the initiation of substance use or reducing use among those who have initiated use early. To accomplish this goal, prevention researchers have tested school curricula focusing on enhancing social competence, providing social influence resistance training, and promoting norms against drug use. The risk factors addressed by these programs include the early age of onset, social influences to use drugs, including drug-using peers, and norms and attitudes favorable to alcohol or other drug use. In addition, interventions to change laws and norms regulating alcohol and other drug behaviors have also been assessed for effects on adolescents.

### *Enhancing Social Competence*

Social competence curricula have been developed that include specific content on prevention of substance use. The **Positive Youth Development Program* combined training in general social competence with information on substance abuse and on how to apply the skills to situations involving alcohol and drug use (Caplan, Weissberg, Grober, Sivo, Grady, and Jacoby, 1992). Participants were students in an urban middle school (90 percent African-American, 8 percent Hispanic, 2 percent mixed race) and in a suburban middle school (99 percent white, 1 percent Hispanic). The 20-session curriculum was provided in two 50-minute sessions per week by university-based health educators who worked with teachers in classrooms randomly assigned to the intervention training.

Regardless of setting, exposure to the curriculum was associated with better impulse control and conflict resolution skills, as rated by teachers, and with lower scores on a self-reported measure of intent to use alcohol. It was also associated with lower rates of self-reported heavy alcohol use among intervention students than among control students, although no significant differences between groups were found in the incidence (rates of initiation) of alcohol, marijuana, or tobacco use.

### *Providing Social Influence Resistance Training and Promoting Norms Against Drug Use*

Many approaches to drug abuse prevention in the schools have been tried. To date, consistently effective interventions have included at least two components: (1) classroom-based training in skills to identify and resist influences to use drugs and (2) encouragement to adopt norms against drug use during adolescence. Social influence resistance training (Ellickson and Bell, 1990; Hansen, Johnson, Flay, Graham, and Sobel,

1988) provides instruction, modeling, and role play for students to learn to identify and resist influences to use drugs. Curricula promoting norms against drug use (Hansen and Graham, 1991; Ellickson and Bell, 1990; Perry, 1986) have included portrayals of drug use as socially unacceptable, identification of short-term negative consequences of drug use, provision of evidence that drug use is less prevalent among peers than children may think, encouragement for children to make public commitments to remain drug free, and in some cases the use of peer leaders to teach the curriculum.

Nearly all curricula include information on the prevalence and effects of alcohol and other drug use. However, this component alone does not appear sufficient to change the drug and alcohol behavior of youth (Hansen, 1992; Schinke, Botvin, and Orlandi, 1991; Stuart, 1974; Weaver and Tennant, 1973).

The combination of social influence resistance and normative change content in school curricula has produced modest significant reductions during early adolescence in the onset and prevalence of cigarette smoking, alcohol, and marijuana use across a number of experimental studies conducted by a variety of investigators (Ellickson and Bell, 1990; Hansen et al., 1988; McAlister, Perry, Killen, Slinkard, and Maccoby, 1980; see Hansen, 1992, for a recent review.)

Hansen and Graham (1991) have examined the relative contribution of the two components in a universal four-condition experimental study, the **Adolescent Alcohol Prevention Trial,* of 3,011 seventh-grade students at 12 junior high schools. The study population was 44 percent white and 54 percent minority (e.g., African-American, Hispanic, and Asian-Americans). Schools were stratified by size, test scores, and ethnic composition, and randomized to the following conditions: (1) an information program about the social and health consequences of alcohol and drug use; (2) a resistance training program on how to identify and resist peer and advertising pressure to use alcohol and drugs; (3) a normative education program geared toward remedying students' false perceptions about the prevalence and acceptability of alcohol and drug use among their same-age peers (methods used included discussing topics in class, completing and reviewing interviews with nondrinkers, developing positive friendships, establishing nondrinking as a positive quality, and writing and videotaping antialcohol rap songs); and (4) a shortened combination of information, resistance training, and normative education.

Results, which were analyzed at the classroom level on data collected in the year following intervention, suggested that normative change was the active ingredient in the curricula. Overall, those classrooms that

received the normative education program had significantly reduced rates of alcohol consumption ($p < .001$), marijuana use ($p < .001$), and cigarette smoking ($p < .05$), compared with classrooms that did not (groups 1 and 2). Analyses were conducted of program effects on prevalence and incidence using dichotomous measures of alcohol, cigarette, and marijuana use. For alcohol use, the greatest effect was on the delay in the age of onset of ever being drunk; the incidence of drunkenness in classrooms not exposed to the normative change component increased 11 percent, compared with an increase of 4 percent for those exposed to that component. There was also a greater increase in prevalence of problem alcohol use in the groups not exposed to the component (an increase of 2.4 percent) than in the normative education groups (which increased 0.3 percent).

Exposure to the normative change component had a similar effect on the use of marijuana. Classrooms that did not receive that component demonstrated an increased prevalence of marijuana use, compared with the normative education classrooms (an increase of 6.2 versus 2.2 percent). Hansen and Graham (1991) have suggested that previously reported positive effects of peer resistance skills-training programs may have been due to the normative education components included in these programs. It appears that the enhancement of social norms against tobacco, alcohol, and marijuana use in adolescence is an essential component of school curricula seeking to prevent the early onset of alcohol and other drug use as a strategy for preventing substance abuse disorders.

Ellickson and Bell (1990) reached a similar conclusion in another universal program, when, at one-year follow-up, the initial effects on alcohol use from their social influence resistance training, **ALERT Drug Prevention*, had disappeared. They speculated that social influence training is less effective in preventing alcohol use than tobacco and marijuana use because a normative consensus has not been established around the use of alcohol.

There is some evidence that the use of peer leaders from the student population to share in the teaching of the substance abuse prevention curriculum is more effective than teacher-led conditions (Botvin, Baker, Filazzola, and Botvin, 1990a; Klepp, Halper, and Perry, 1986; Murray, Johnson, Luepker, and Mittelmark, 1984; McAlister, 1983). Peer leaders may be effective in stimulating classroom norms antithetical to drug use.

Perry and colleagues, in a four-country pilot study conducted under the auspices of the World Health Organization, attempted to delay the onset of alcohol use in eighth and ninth graders and to reduce the use of alcohol by those already involved with it (Perry, Grant, Ernberg,

Florenzano, Langdon, Myeni et al., 1989). Twenty-five schools were randomly assigned to one of three conditions: peer-led education, teacher-led education, or control. The teacher-led and peer-led curricula (five sessions) were identical in content, except for the fact that the peer-led program took place in small groups, whereas the teacher-led program was conducted with the classroom as a whole. Self-report data at one-month follow-up showed that peer-led programs for teenage drinkers and nondrinkers were significantly more effective in preventing or reducing alcohol use than programs taught by teachers.

Although attention to the establishment of a clear consensus regarding norms is apparently an important component of substance abuse prevention programs, this strategy has some limitations and risks. For example, Ellickson and Bell (1990) found that although their curriculum was effective in preventing tobacco use among those who were not tobacco users in grade 7, the program had counterproductive effects on those already smoking. Smokers at baseline who were exposed to the curriculum actually smoked more at posttest than their control counterparts. It is plausible that explicit campaigns to show drug use as nonnormative behavior isolate or alienate those who already engage in that behavior. Ellickson and Bell found that these individuals were already at risk for mental health problems by virtue of high levels of family conflict, problems in parent-child communication, early delinquency, low achievement, and low commitment to school (truancy).

### *Multicomponent Interventions*

The establishment through public policy of clear normative standards regarding alcohol and other drugs appears important in preventing or at least delaying the onset of drug use. Peers, family members, the community, and the media all influence the development of an adolescent's norms and attitudes regarding behavior. Some drug abuse prevention programs have combined school-based curriculum interventions with interventions focused on parents, community leaders, and the media to promote greater normative clarity and consistency in the adolescent's social environment.

Pentz and colleagues tested a multicomponent communitywide program, The **Midwestern Prevention Project*, involving a curriculum of social influence resistance skills training and normative change content for students in grades 6 and 7 (Pentz, Dwyer, MacKinnon, Flay, Hansen, Wang, and Johnson, 1989). A 10-session school-based universal intervention provided information on the health consequences and prevalence of substance use and taught assertiveness and social resistance

skills. This was combined with homework assignments to be conducted with parents; booster sessions in the year after the initial intervention; organizational and training opportunities for parents in positive parent-child communication and in reviewing school policies; training of community leaders to organize drug abuse prevention task forces; and news coverage via newspaper articles, short television clips, and a press conference. The multicomponent program produced lower rates of weekly cigarette smoking (down 8 percent), alcohol use (down 4 percent), and marijuana use (down 3 percent) after the second year of intervention, and significantly lower prevalence of monthly cigarette (down 6 percent) and marijuana (down 3 percent) use three years after the initial school intervention, although the prevalence of alcohol use was not significantly reduced at this measurement point (Johnson, Pentz, Weber, Dwyer, Baer, MacKinnon, Hansen, and Flay, 1989). The comprehensive intervention appears to have been effective in lowering tobacco and marijuana use prevalence among those at risk because of exposure to parental drug use, drug-using peers, and early initiation of use.

This study's conclusions are tempered by methodological considerations. Only 8 of the 42 participating schools were randomly assigned to experimental and control conditions. In the other 34 schools, the assignment was based on the flexibility of the principal and his or her willingness to reschedule classes to accommodate the intervention. Additionally, students in different grades were compared in the quasi-experimental nonequivalent comparison group design. The results of a more controlled trial of the multicomponent intervention conducted by Pentz and her colleagues in Indiana have not been reported in full. Nevertheless, the results reported to date indicate multiple drug use behaviors were reduced by the combination of curriculum and mobilization of parents, community members, and the media to promote norms consistent with those provided in the curriculum.

### *Policy Initiatives*

Substance abuse disorders depend on the availability of substances and on the prevalence of substance use in the population. Current policy-focused prevention strategies seek to limit the availability of drugs through prohibition of drugs such as marijuana and cocaine, taxation on alcohol at purchase (Levy and Sheflin, 1985), raising the minimum drinking age (Joksch, 1988; Saffer and Grossman, 1987; Cook and Tauchen, 1984; Kreig, 1982), and restrictions on how alcohol is sold (Holder and Blose, 1987). The legal status of a substance is associated

with the prevalence of its use in the population. Alcohol, an intoxicant legal for adults to purchase and use, is the substance most widely used by both adults and adolescents. Alcohol abuse and alcoholism are, in turn, the most prevalent substance abuse disorders.

With respect to alcohol, increases in taxes on alcohol at purchase have been shown to produce immediate and sharp decreases in liquor consumption rates and cirrhosis mortality (Cook and Tauchen, 1982). Similarly, increased alcohol availability resulting from the privatization of wine sales has been shown to result in at least short-term increases in alcohol consumption (Wagenaar and Holder, 1991). However, longer time series analyses conducted by Mulford, Ledolter, and Fitzgerald (1992) have suggested that the increased consumption following privatization of sales is only temporary. Long-term sales trends in one state tracked for 10 years were unaffected by the change in distribution system approximately midway through the period.

Increasing the legal age for drinking alcohol to 21 years has been shown to be associated with lower levels of alcohol use among high school seniors and recent high school graduates, and with lowered involvement in alcohol-related fatal crashes among drivers under 21 (O'Malley and Wagenaar, 1991). Lower levels of alcohol use persisted into the early twenties, beyond the legal drinking age.

Investigation of another policy measure to limit alcohol availability, restricting how alcohol is sold, has shown that allowing patrons to purchase distilled spirits by the drink increased the consumption of distilled spirits and the frequency of alcohol-related car accidents (Holder and Blose, 1987).

### *Evidence from a Quasi-Experimental Study*

As noted above, components on alcohol and other drugs have been included in some social competence curricula (Caplan et al., 1992). Conversely, the work of Botvin and colleagues in substance abuse prevention has combined (1) training in skills to resist social influences to use drugs with (2) a focus on the development of general social competences, including verbal and nonverbal communication skills, skills for social interaction with same- and opposite-sex peers, assertiveness skills, and skills for coping with anxiety (Botvin et al., 1990a; Botvin, Baker, Tortu, and Botvin, 1990b). A recent evaluation suggested the promise of this approach when led by peers, but the evaluation highlighted the importance of the fidelity or integrity of implementation of curricula-based interventions (Botvin et al., 1990a). Only about 62 percent of the trained experimental teachers in their study implemented

ercent or more of the curriculum content. This finding has clear ications for the dissemination of preventive interventions.

### Programs Aimed at Preventing Conduct Disorder

nduct disorder involves frequent, persistent, and patterned antisobehaviors, including delinquent behaviors, whether against prop (e.g., burglary, fire-starting) or persons (e.g., fighting, violent ior, rape), as well as other problem behaviors (e.g., lying, running ). (For more detailed descriptions of conduct disorder, see Chap 5 and 6.) During adolescence, conduct disorder increases in preva and affects current functioning. Conduct-disordered behaviors become integrated into the behavior patterns of the individual ng adolescence predict antisocial personality in adulthood, indicate for other disorders (including mood disorders and schizophrenia), affect adult functioning and opportunities.

sk factors associated with the development and diagnosis of con disorder include early aggressive behavior, school failure, criminal lcoholic behavior of parents, poor family management practices inconsistent discipline, poor monitoring), and family conflict din, 1990). These factors are often well established before the onset olescence. During early adolescence, as with substance use, peer ences and norms conducive to antisocial behaviors increasingly and gly predict involvement in delinquent and other problem behaviors tt et al., 1989).

contrast to substance abuse prevention, the preponderance of the uated efforts to prevent conduct disorder have focused on individ at risk rather than on community or school populations. For ple, preventive interventions effective in preventing conduct dis r during adolescence have focused on 12- to 15-year-olds at risk by of academic or behavioral problems and by virtue of an older g's involvement in status offenses.

family-focused treatment intervention in an experimental study onstrated positive effects in preventing delinquent behaviors in gs of 13- to 16-year-olds who had committed minor delinquent ses or had been declared ungovernable by the juvenile court xander and Parsons, 1980, 1973). The intervention combined behavanagement skills training techniques for parents with communica skills training. The brief family systems intervention significantly ed patterns of communication within experimental families and ted in statistically significant preventive effects on younger siblings. - to 3½-year follow-up of the juvenile court records of the younger

siblings of the originally targeted participants found that 20 percent of the younger siblings in families that received the short-term family systems intervention were referred to court, compared with 43 to 63 percent of the younger siblings in families that received other experimental or control conditions (Klein, Alexander, and Parsons, 1977).

Some indicated preventive interventions that have shown positive effects in preventing delinquency have involved both family and school intervention. Bry's (1982) three-year indicated preventive intervention, **Behaviorally Based Preventive Intervention*, targeted adolescents with academic and behavior problems at school. Samples of seventh-grade students with low academic motivation, alienation from family, and several school discipline referrals were identified in a low-income urban school and a middle-income suburban school. Within schools, participants were placed in matched pairs on the basis of sixth-grade academic records and randomly assigned to receive the intervention or serve as controls. The intervention consisted of the use of positive reinforcements for desirable school behavior. Weekly report cards were used to monitor student behavior in the classroom as reported by teachers. Program staff met weekly with intervention students to discuss report cards. Positive reports elicited praise and approval from staff, and negative reports elicited discussions of how to win more approval from teachers. Parents were routinely informed of students' progress through phone calls, letters, and home visits. Booster sessions were also provided every two weeks over a period of two years following the initial intervention, although attendance at booster sessions was low. Nevertheless, the intervention appeared to prevent later delinquency as measured both by self-reports of criminal behavior at one-year follow-up and by court records at five-year follow-up. Ten percent from the intervention group, compared with 30 percent from the control group, had accumulated a court file.

### Evidence from Quasi-Experimental Studies: Altering School Organization and Social Environments

School transitions represent a time of risk for increased symptoms of psychological problems. Both substance use and antisocial behaviors increase in prevalence following transitions from elementary to middle or junior high school and from middle school to high school. There is evidence that the structure of schooling itself may affect these changes in behavior following school transitions (Hamburg, 1992). Comprehensive recommendations for changing the structure of education, especially in middle schools, have been made (Carnegie Council on Adolescent Development, 1989).

Gottfredson and Gottfredson (1992) also have focused on changes in school organization and management in testing interventions to prevent delinquency and substance abuse in secondary schools. (See similar work by Comer in the section on interventions in the elementary period.) An important ingredient in the Gottfredsons' work is a focus on providing a method for school stake-holders to reorganize the school to make it more effective in the social and cognitive development of all students. The method involves a systematic assessment of school problems carried out by a school improvement team of teachers, parents, school administrators, community agencies, students, and district-level staff. The team reviews school policy, climate, instruction, and organization and plans and implements changes. The intervention is called the *Program Development Evaluation* method (Gottfredson, 1984).

Gottfredson (1986) evaluated an intervention that included the establishment of an organizational structure to facilitate shared decision making and management in schools, the use of curriculum and specialists trained to respond to student concerns, academic innovations including cooperative learning, reading and test taking programs, and career exploration. In addition, direct services were provided to a randomly assigned subsample of high-risk students in participating schools. After three years, students in experimental schools reported lower rates of drug use, delinquent behavior, and alienation, and higher rates of attachment to school, higher educational expectations, and a greater belief in school rules than students in comparison schools. However, although the direct services for selected high-risk students improved their school achievement (promotion and graduation rates), these services did not produce significant effects on the delinquent behaviors of the high-risk students over and above the effects of the organizational intervention in the school (Gottfredson and Gottfredson, 1992; Gottfredson, 1986).

Gottfredson has evaluated the method in inner-city Baltimore, Maryland, and in Charleston, South Carolina. The Baltimore study showed significant decreases in rebellious behavior and negative student attitudes toward school following use of the method (Gottfredson, 1988). An evaluation of the method in six Charleston schools found that, in comparison with control schools, those using the method improved significantly in classroom order, classroom organization, and clarity of rules (Gottfredson, Karweit, and Gottfredson, 1989).

Another broad intervention targeted the school environment at a particular developmental phase. Felner and colleagues focused on the restructuring of schools through the *School Transitional Environmental*

tion from middle school to high school, including academic failure and low commitment to school (Felner, Ginter, and Primavera, 1982; Felner and Adan, 1988). The intervention had two components: (1) reorganizing the school environment to alleviate stressors associated with the transition and (2) redefining the role of homeroom teachers to give them more central roles as counselors and mediators between students and the school administration. The goal of STEP was to enhance adjustment through a school restructuring program that assigned project students to one of four experimental homerooms. The homeroom teachers were given more responsibility to meet the administrative, counseling, and guidance needs of their students. The students in the experimental groups were assigned to take their core academic courses (math, English, social studies, and science) together, and all the experimental classrooms were in close proximity to enhance feelings of belonging and social support among a more stable cohort of peers. The underlying hypothesis was that by changing the role of school personnel and the overall social ecology of the high school environment to increase levels of social support available to students and reduce the confusion and complexity of the new school environment, both academic and personal adjustment would be enhanced.

The effectiveness of STEP, a selective preventive intervention, was examined with a sample of 185 ninth graders (65 in the experimental group and 120 in the control group) from a primarily minority, lower-income high school. The experimental sample was selected randomly from the entering ninth-grade population who had met all requirements for the eighth grade and who had not been identified as needing special mental health services. The control group was matched on age, gender, and race with the experimental group, but there was no random assignment to the groups. Three-year follow-up data collected at the end of high school revealed lower school dropout rates for the students in the experimental group (21 versus 43 percent of controls) (Felner and Adan, 1988). Positive effects on two indexes of school adjustment, namely, grade point average ($p < .05$) and absenteeism ($p < .05$), were observed following the intervention and were maintained through grade 10. In addition, project students rated the school environment as demonstrating greater order, rule clarity, teacher control, and innovation ($p < .01$), suggesting that reported changes in behavior and academic performance reflected changes in the school environment associated with the intervention. These results show the promise of interventions aimed at the risk factors associated with school transitions. They also suggest that throughout primary and secondary school, having a close relationship with a supportive teacher may be a signifi-

ant protective factor against academic and mental health problems. elner has now combined the school restructuring components of STEP vith curriculum changes suggested by the Carnegie Council and ap- lied the program in 50 schools with 22,000 children (R. Felner, personal ommunication, 1993).

Others have taken a more comprehensive approach by targeting the roader social environments of the school, family, and community, eeking to spread the prevention message throughout the social envi- onments affecting the adolescent. Olweus's **Intervention Campaign gainst Bully-Victim Problems* was designed to prevent bullying among ildren and adolescents in Norway (Olweus, 1991). The primary mphasis of the multicomponent prevention program was to educate ie community, families, and school personnel on the scope of the ully-victim problem, and potential solutions. The intervention program as implemented as a nationwide campaign. The components of the rogram included (1) an educational booklet on the bullying problem istributed to all schools, (2) parent education (in the form of a booklet) n the bullying problem and possible solutions, (3) a 25-minute video ith stories about the lives of "bullied children," which was available r rent or sale, and (4) a self-report questionnaire to be completed by ie children in the program.

The universal preventive intervention was evaluated by using a uasi-experimental cohort sequential design, and time-lagged compari- ons were made between age-equivalent groups. The sample consisted f 2,400 students in grades 4 through 7 from 42 primary and secondary chools. Using self-reports of "being bullied" and "bullying others," the ndings indicated a 50 percent reduction in the levels of bully-victim roblems at both the 8-month and the 20-month follow-up assessments. uths also reported a reduction in reports of antisocial behavior (e.g., andalism, theft, truancy) and an increased satisfaction with school life. lthough the design does not rule out potential sources of influence, the ct that children reported a reduction in bullying, victimization, and ther antisocial behavior following the intervention suggests the poten- l benefit of interventions seeking to reduce violence by establishing ommonly shared concerns regarding antisocial behavior and discour- ging such behavior in the media, schools, and homes.

### Evidence from a Quasi-Experimental Study: Programs Aimed at Violence Prevention

The emergence of concern with violence as a major public health roblem (Rosenberg and Mercy, 1991; Sullivan, 1991; see also Chapter 3)

has led to the development of interventions focused on preventing violent behaviors included in the diagnostic criteria for conduct disorder. In this area the emerging prevention strategies bear some resemblance to prevention programs targeting substance abuse. That is, the preventive interventions focus on changing norms regarding violent behavior and providing skills to solve problems without violence. Social competence promotion in problem solving and developmentally appropriate social interaction have been included in school-based curricula seeking to prevent violence. However, the committee is aware of no published controlled studies of classroom-based prevention curricula focused explicitly on preventing violence, although some studies are under way.

To date, methodological problems, including quasi-experimental designs, have thwarted a clear assessment of the effectiveness of community-based intervention programs to prevent violence in the United States. For example, the *Violence Prevention Project (VPP)*, a comprehensive prevention program using a community-based model for the prevention of youth violence, recently reported data from an evaluation study of the intervention (Hausman, Spivak, Prothrow-Stith, and Roeber, 1992). The curriculum included a 10-session community-based "Violence Prevention Curriculum for Adolescents" and a mass media normative change campaign involving television, posters, T-shirts, and brochures. The results indicated little difference in exposure to the intervention between youths in control neighborhoods and youths in experimental neighborhoods. About 55 percent of both experimental and control youths self-reported exposure to the intervention. The results underscore the importance of monitoring implementation and program exposure in evaluating preventive interventions. They also leave open the question of whether combined interventions focused on establishing norms opposed to violence are effective in actually preventing it.

### Findings and Leads

- Prevention of early substance use has been shown to be a logical and effective strategy for the prevention of substance abuse disorders. There is evidence that the incidence of substance use can be reduced by school curricula that promote norms antithetical to substance use and teach skills to resist social influences to use drugs. The promotion of clear norms against use appears to be a key component of these interventions. There is also evidence that promoting explicit norms against use in family, school, and community settings through multicomponent communitywide interventions holds promise for preventing

early substance use. However, normative change strategies may be counterproductive with some of those at highest risk by virtue of their exposure to multiple biopsychosocial risk factors. For example, adolescents who have been exposed to parental alcoholism and violence and who have already initiated use of alcohol themselves may react to normative change campaigns by increasing their substance use. This possibility suggests that combining risk reduction interventions introduced earlier in development with norm-focused interventions during adolescence might be a useful approach.

- There is also evidence that preventive interventions that seek to restrict the availability of alcohol and other substances through higher taxation, raising the legal age of drinking, or limiting how liquor is distributed may reduce both the rates of alcohol consumption and the adverse consequences associated with alcohol use, including alcohol-related accidents.
- During adolescence, initiatives focused on the nature and structure of schooling and school experiences themselves may have mental health promotion or disorder prevention potential. Few of these interventions have been evaluated for effects on conduct or other mental disorders, but a number have shown effects in reducing risk factors. Examples include efforts to promote broader academic success during adolescence.
- The concept of school reorganization and the leads from Comer's and the Gottfredsons' studies suggest the promise of efforts to empower school communities at both the elementary and the secondary levels to regain control of the cognitive and social development agenda of their schools. Intervention trials that focus on identifying how the school and its community can be more effective in reducing risks for and enhancing protective processes against the development of psychopathology may be particularly useful.
- There is some evidence from Norway that preventive interventions can change community norms regarding aggression. The extent to which such a normative consensus can be created regarding the prevention of violence in this country, given the diversity of race, culture, and class, remains to be demonstrated.
- Attention to fidelity and integrity of implementation is critical to the success of a prevention program.

## INTERVENTIONS FOR ADULTS

Movement from adolescence to adulthood changes the developmental tasks facing the individual as well as the nature of the risk and protective factors. As various life domains in adulthood, such as family and work

life, begin to exert their separate influences, developmental tasks become more differentiated (see Figure 7.2). These tasks include establishing and maintaining committed relationships as well as successful childbearing and effective parenting. Assuming and maintaining occupational roles are also crucial, not only because work can provide a sense of mastery and satisfaction, but also because paid employment provides material support for the developing adult and his or her family. For some adults—particularly poor, single parents—coping with chronic stressors such as financial hardship and lack of emotional support for their parental role also complicates their efforts to perform these tasks successfully and places them at increased risk.

In adulthood, psychosocial risk factors that increase the likelihood of mental health problems correspond closely to these developmental tasks. Marital conflict and divorce, unsupported childbirth and childrearing, stressful work roles and occupations, involuntary job loss, chronic poverty, and discrimination all constitute critical risk factors in adulthood, particularly among those with psychosocial or biological vulnerabilities.

However, there are corresponding protective factors that, when incorporated into systematic preventive intervention efforts, can help to reduce the likelihood of mental disorder. These include problem-solving skills, the availability of responsive social and medical services, and social, material, and emotional support from friends, family, and others. Work supervisors, health personnel, teachers, spouses, and others can be potent sources of either support or stress or both. In addition, a variety of social skills, including the ability to cope with one's emotions, to control the demands of work and mobilize supportive co-workers, to use job seeking skills, and to nurture spouse and family support, all are protective factors that can help safeguard mental health.

The following review of a number of prevention programs focuses on five major areas of adult life where preventive trials have reduced risk factors and enhanced protective factors in the course of adult development. These include programs aimed at (1) the development and maintenance of marital relationships, as well as programs for coping with marital separation; (2) the special stresses of childbearing and childrearing; (3) occupational stress and job loss; (4) preventing depressive disorders among adults at risk because of poverty and minority status; and (5) supporting adult children who provide care for ill parents.

## Programs Aimed at the Marital Relationship

The marital relationship can be a major protective factor or stressor, especially for vulnerable individuals. Two preventive programs are

other is intended to cope with the risks associated with separation
d divorce.

### *hancing Marital Relationships*

Destructive marital conflict and marital distress are major risk factors many forms of interpersonal and psychological dysfunction and ychopathology (Coie, Hawkins, Ramsey, and Watt, 1991). Specifi-y, marital distress has been associated with higher rates of depres-n in adults and also related to the development of conduct disorder in ldren (see Chapter 6). Markman (1984) has argued that destructive nflict among spouses, marital distress, and the effects of divorce nstitute a major social problem that costs billions of dollars per year. Markman and colleagues have developed the **Prevention and Relation-p Enhancement Program (PREP)*, designed to prevent distress and orce in couples who are already married or planning marriage nick, Blumberg, and Markman, 1992). PREP, a universal preventive ervention, is based on the identification of and intervention with iables that are most predictive of later distress and relationship isfaction. Couples who are not currently experiencing relationship ficulties are taught skills identified by research as predicting satisfying d healthy relationships. They are also taught how to thwart those haviors that predict later marital distress. The central principle under-ng the program is that the constructive handling of disagreements can vent later distress. Furthermore, PREP assumes that opportunities in elationship should be created to control conflicts and handle problems re they get too large.

Earlier research on which PREP is based (Markman, 1984, 1981, 1979; ttman, Markman, and Notarius, 1977) suggested that distressed and ndistressed couples communicate differently. Distressed couples re found to engage in negative escalation during discussions, ereas nondistressed couples exited at the beginning stages of nega-e interaction cycles (Gottman et al., 1977). Furthermore, longitudinal ies (Markman, 1984, 1981, 1979) indicate that the quality of commu-ation before marriage and before the development of distress in the ationship is one of the best predictors of future marital distress.

The PREP intervention takes one of two formats. In the extended sion, couples attend six 2- to 2½-hour weekly sessions in groups of r to eight couples. They hear lectures on communication skills and n privately practice their new communication skills to discuss issues heir relationship. The communications consultant acts as a coach to

help the couple master these new skills. In the second format, groups of 20 to 40 couples hear the same lectures at a weekend retreat and then use their private rooms to practice their skills on their own.

At the 1½-year follow-up, PREP couples report greater relationship satisfaction and fewer relationship problems. At three years, they report fewer sexual difficulties and less problem intensity. At four years, PREP husbands report better relationship satisfaction than controls and show less dominance, conflict, and overall negative communication. At five years, husbands report greater relationship satisfaction, show less denial and negative escalation, and use more problem-solving behaviors. In addition, at five years, 19 percent of control couples had divorced, whereas only 8 percent of PREP couples had done so. Furthermore, PREP couples reported fewer instances of physical violence with their spouse than did control couples across the three-, four-, and five-year follow-ups (Markman, Renick, Floyd, Stanley, and Clements, 1993).

Most of the evaluation findings for the PREP program have focused on reduction of risk factors rather than specific mental health outcomes, and an improved version of this study would also assess mental health outcomes. This program has been disseminated both in Europe and in the United States and has been adopted for use by clergy, who often provide premarital counseling.

### *Coping with Separation and Divorce*

The epidemiology of divorce as well as stressful life events theory (Bloom, 1985) suggests that marital separation and divorce constitute major stressful life events with major impacts on health and mental health. Epidemiological research conducted in Pueblo, Colorado, as well as a review of the research literature (Bloom, Asher, and White, 1978), indicates that marital separation is associated with higher levels of distress, anxiety, and depression and higher rates of admission to psychiatric inpatient facilities.

Five specific categories of risk can be identified in the literature associated with marital separation and divorce. They include (1) weakened support systems, (2) problems with childrearing and single parenting, (3) legal and financial issues, (4) housing and homemaking problems, and (5) education and occupational problems, particularly for the female spouse in joining or rejoining the labor force.

Bloom and Hodges developed the **University of Colorado Separation and Divorce Program* specifically to address these risk factors and to enhance protective factors (Bloom, Hodges, Kern, and McFaddin, 1985; Bloom,

Hodges, and Caldwell, 1982). This intervention is aimed at newly separated persons who are engaged in the task of negotiating the transition to single life with new occupational and childrearing responsibilities. It is not aimed at improving preexisting marital relationships. Participants had separated because of marital discord and had been separated no longer than 6 months. Bloom and Hodges (1988) followed a number of guidelines in designing the selective program. Principles included the use of a clear program rationale, focus on newly separated persons, specified duration and eligibility requirements, use of a university site so as to avoid defining marital separation as an illness, economical program delivery, a goal of education and competence enhancement, and attempts to be comprehensive in the range of services.

The Separation and Divorce Program was coordinated by a number of program representatives, each of whom worked with 15 newly separated persons. Information in coping with a wide variety of life domains was provided by subject matter specialists, who provided two-hour workshops with groups of participants. Program areas included socialization, childrearing and single parenting, housing and homemaking, employment and education, and legal and financial issues, all designed to enhance coping skills and mobilization of support.

After four years of follow-up in a well-designed and well-executed randomized trial, a number of positive impacts on mental health could be observed. Experimental group members were significantly higher in adjustment, had fewer separation-related problems, and reported significantly greater separation-related benefits than controls. Positive program effects, including lower levels of psychiatric symptoms, were still evident after four years. Preventive effects included reductions in maritally related sources of distress as well as in symptoms of anxiety and depression (Bloom et al., 1985).

The Separation and Divorce Program has been documented with a series of research papers and also a clear and well-documented program manual, which includes details of rationale, design, data collection, and examples from the point of view of participants and staff members.

### Programs Aimed at the Challenges of Childbearing and Childrearing

Childbearing and childrearing present major challenges that can affect the well-being of women and their children. Below are two prevention programs that promise to reduce risks associated with insufficiently supported childbearing and childrearing.

### *Coping with the Stresses of Caesarean Childbirth*

Women who deliver children by caesarean section are more likely than control populations to develop postnatal depressive symptoms (Kendell, Rennie, Clark, and Dean, 1981). In addition, the emotional difficulties encountered by women delivering by caesarean birth (CB) are accentuated by hospital practices and attitudes of the hospital staff (Cohen, 1977; Donovan, 1977). Tadmor (1988) reported that CB mothers were not usually well prepared for the event and were cast into the role of surgical patient rather than mother. They were also often separated for longer periods from their children and their new babies, and they may not have received adequate support from their spouse.

The specific psychological and developmental tasks confronted by the CB mother include acquiring a realistic appraisal of the reasons for the caesarean birth and a share in the decision-making process. In addition, she faces the task of dealing with the loss of the natural childbirth process and with the negative feelings associated with caesarean birth. Other psychological tasks include establishing an attachment to the baby and dealing with the physiological limitations imposed by the caesarean birth.

Tadmor and Brandes developed the **Perceived Personal Control (PPC) Preventive Intervention for a Caesarean Birth Population*, a selective prevention program, to enable the CB mother to accomplish the specific psychological tasks associated with caesarean births and to enhance her coping skills so that she can ensure a positive outcome and deal successfully with any future caesarean births (Tadmor, Brandes, and Hofman, 1988; Tadmor and Brandes, 1984). The underlying theoretical framework of the intervention is the perceived personal control crisis model developed most specifically by Caplan (1977) and Caplan and Killilean (1976). The premise of this model was that the availability of a coping response that mediates between the individual's appraisal of some event and his or her responses to it is a critical protective factor that will produce a generalized measure of resistance to stressors.

The intervention begins with an anticipatory guidance session, which helps to familiarize the CB couple with the medical environment and the sequence of steps through which they will pass. They receive detailed information with respect to the course, safety, and duration of the caesarean birth, anesthesia, and the physiological and emotional reactions they can anticipate. During the birth itself, the father actively provides emotional support to the mother. A variety of efforts to enhance the possibility of immediate bonding between infant and

parents are engaged. After delivery, the mother and father are given full care of the baby under supervision.

The program was evaluated in a randomized controlled trial. Mothers completed questionnaires on the fourth or fifth postpartum day, and there were follow-ups at 6 and 12 months after the caesarean birth to assess physiological and psychological recovery and to document the implementation of the intervention model, beneficial effects of the model, duration of full breast-feeding, and response to crises.

Results indicated that the program had a number of impacts. Experimental mothers were released from the hospital sooner than controls, initiated independent care of the baby sooner, and continued nursing longer. After day one, experimental mothers requested less medication than controls, and experimental fathers showed closer attachment to the babies than control fathers. Experimental mothers also had a more rapid psychological recovery from the caesarean birth, and distress was reduced.

The PPC intervention is designed to be implemented only in a community institution such as a general hospital. Resistance in the hospital by medical and nursing staff is a major potential limitation. Implementation requires dealing with a complex network of interlocking events and may impose additional burdens on the staff as well as on the mental health worker who implements the program. Furthermore, continuous training has to be provided for new physicians and nurses who join the department.

### *Enhancing Personal Development of New Mothers*

The **Prenatal/Early Infancy Project* is a comprehensive selective preventive intervention designed to prevent a wide range of maternal and child problems often associated with poverty (Olds et al., 1988; Olds et al., 1986). It is a unique program in that it targeted both children and mothers and measured outcomes for both generations. The design of the study and the outcomes related to improved parenting and reducing risks for the children were presented in the section "Interventions for Infants" earlier in this chapter. Discussion here is limited to intervention strategies and outcomes related to the mothers' personal development.

The Prenatal/Early Infancy Project was based on the assumption that nurse home visitors are in an ideal position to identify and change factors in the family environment that interfere with maternal health habits and personal accomplishments in the area of work, education, and family planning. Beginning during pregnancy, nurses attempted to form effective and supportive relationships with the women by emphasizing the women's personal strengths. Nurses encouraged the women

to clarify plans for completing education, returning to work, and bearin additional children. Nurses stressed that the decision to return to scho and seek employment after delivery should be made after full consi eration of the women's own best interests as well as the babies'. Nurse helped interested women find appropriate jobs or job placement ser ices and plan for child care. They also advised them about job intervie and showed them and their partners birth control devices, discussin the advantages of different methods of family planning.

Results of a randomized controlled trial evaluating the effect of th nurse visiting program on outcomes for the mothers showed reductio in a number of risk factors. Among women who had not graduated fro high school when registered for the study, 59 percent of the nurs visited and 27 percent of the comparison group had either graduated enrolled in an educational program by six months postpartum.

Between birth and the 22-month follow-up, the nurse-visited, poo unmarried older women had worked 2½ times longer than the counterparts in the control group, who were not nurse-visited. Qua tative analysis of the employment data indicated that by the 46-mon interview, most of the women who worked held unskilled labor a service positions; some held semiskilled jobs; and a few were in cleri or sales positions. Nurse-visited, poor, unmarried older women r ported that they received more help from other families with child ca and were on public assistance 157 fewer days than the poor, unmarrie older women in the control group, a 40 percent reduction. This effe however, did not extend into the two-year period following the end the intervention at 24 months postpartum. Subsequent pregnanci were reduced in the nurse-visited, poor, unmarried group, with t women having one third fewer subsequent pregnancies than the poo unmarried women in the control group.

### Programs Aimed at Occupational Stress and Job Loss

Work and unemployment represent areas of risk for adults. Occup tional stress on the one hand and job loss on the other represent critic points for preventive intervention. Two preventive programs are d scribed below, one aimed at a stressful work role, the other at vulnerab persons who have recently experienced job loss.

#### *Occupational Stress and Coping*

In work life and more generally, the beneficial and protective facto of social support on health are well documented (Israel and Round

1987; Cohen and Wills, 1985; Berkman, 1984; House, 1981). Social support has been associated with longer life (Berkman, 1984), compliance with health regimens, higher levels of psychological well-being, decreased morbidity (Cohen and Wills, 1985; House, 1981), and more rapid recovery from serious physical illness and injury. In addition, a variety of studies have shown that social support can buffer the adverse consequences of stress. Although the mechanisms are not yet entirely understood, low levels of social support have been firmly established as a risk factor for poor mental and physical health (Berkman, 1984).

House (1981) and Thoits (1986) have suggested that social support can protect employees from the deleterious effects of exposure to unmodifiable or unavoidable work place stressors. Mechanisms through which social support may provide its positive effects include helping employees to modify stressful situations, develop new appraisals of stressful situations, and decrease the emotional upset associated with problematic situations.

The **Caregiver Support Program* (Heaney, 1992) is a selective prevention program designed to help one particular occupational group, house managers and direct caregivers of the mentally ill and developmentally disabled in group homes. Caregivers work long hours on multiple and rotating shifts, with mental patients who are sometimes assaultive. Their job responsibilities include helping clients with activities for daily living, carrying out behavioral programming, accompanying clients on community outings, and coping with a variety of unscheduled demands and tasks, sometimes in relative social isolation. The low levels of social support, high levels of burden and work demands, and inadequate material and informational resources for coping with the task of caregiving all constitute risk factors for psychological distress (Heaney, 1992).

The Caregiver Support Program was designed to train house managers and caregivers to cope more effectively in their stressful work environment. Six weekly or biweekly training sessions, involving analysis and strengthening of social networks, developing effective staff training skills, and work group problem solving, as well as maintaining new skills and occupational self-esteem, were delivered to house managers and at least one other member of each group home support team. Training sessions were facilitated by a pair of trainers, and training protocols were highly specified and delivered with high reliability.

A randomized controlled trial evaluating the Caregiver Support Program showed changes in risk factors, with the strongest effects occurring as improvements in supervisor support, reductions in supervisor undermining, and higher levels of contact with and positive feedback from supervisors in the experimental group. In addition, the program

reduced depressive symptoms and somatization among employees most at risk for leaving their jobs.

As with many work place interventions where participation is voluntary, there is likely to be substantial variation in exposure to the actual intervention, even in a randomized experiment. Statistical models can estimate the interaction between characteristics associated with participation and actual exposure to the intervention to estimate experimental effects, but differential selection into or out of exposure to the intervention remains an issue. The effects of the intervention were probably reduced by the incomplete implementation associated with the "train-the-trainer" approach, in which only house managers and one direct care staff person per home were primarily exposed to the training intervention. Thus the effects of exposure to the Caregiver Support Program represent a lower-bound estimate of the program's impact.

### *Coping with Job Loss and Reemployment*

There is substantial epidemiological evidence that unemployment is associated with higher levels of mental health problems, particularly symptoms of depressive and anxiety disorders (Kessler, Turner, and House, 1988). Furthermore, involuntary job loss is a stressful life event that produces a range of subsequent crises, including financial hardship and family conflict. Some epidemiological evidence suggests that in addition to higher levels of anxiety and depressive disorders, unemployment rates are associated with higher levels of alcohol abuse, child abuse, marital conflict, and a variety of other related mental health problems (Gordus, 1984). These data are of mixed quality, but more recent, community-based epidemiological studies by Kessler and colleagues indicate a higher relative risk of high levels of symptoms of depressive disorders and anxiety disorder in unemployed groups than in steadily employed groups (Kessler et al., 1988; Kessler, House, and Turner, 1987).

The process of job seeking itself is stressful, but the process can be enhanced by protective factors that reduce the likelihood of lowered motivation, discouragement, and prolonged unemployment. Such protective factors include the acquisition of effective job-seeking skills and strong social support during the job-seeking process.

The **JOBS Project for the Unemployed* was a selective preventive intervention designed to help job losers cope with the stresses of job loss and setbacks in the job search process, as well as seek social support and develop and use job-searching skills leading to more rapid reemployment in high-quality jobs (Price, van Ryn, and Vinokur, 1992; Vinokur,

Schul, and Price, 1992; Caplan, Vinokur, Price, and van Ryn, 1989; Vinokur, van Ryn, Gramlich, and Price, 1991).

The intervention was based on the theory of self-efficacy; that is, the knowledge that one can succeed is a motivational force for attempting difficult behaviors. The target group for the JOBS intervention was recent job losers who had applied for unemployment insurance from the various offices of the Michigan Employment Security Commission. It was delivered to groups of 18 to 20 persons in the form of a training program with eight three-hour sessions over two weeks. Trainers were trained intensively before program delivery, and the intervention was monitored closely by observers during delivery. Pairs of trainers delivered a standard curriculum to job losers, including components on (1) skills training and support for dealing with obstacles to reemployment, (2) identifying sources of job leads, (3) finding job leads and social networks, (4) conducting an information interview, (5) handling emotions related to unemployment, (6) practicing and rehearsing interviews, (7) thinking like an employer, and (8) evaluating a job offer.

The impact of the JOBS project was evaluated in a randomized controlled trial. Two and one-half years after the completion of the randomized trial, people in the experimental group showed significant reductions in depressive symptoms (Price et al., 1992). Furthermore, participants obtained higher-paying jobs and higher-quality jobs, which resulted in higher income, and therefore higher tax revenues. The benefit-cost analysis results indicated that the cost of the intervention (approximately $300 per person) was rapidly offset by these increased tax revenues (Vinokur, van Ryn, Gramlich, and Price, 1991). Other analyses indicated that women in general and people with less education, who were at higher levels of disadvantage, benefited more from the JOBS intervention (Vinokur et al., 1992). Additional analyses indicated that the JOBS intervention was most successful with those people who were at highest risk for subsequent episodes of depressive symptoms.

The primary limitation of the JOBS project is that it was explicitly designed for and has been tested only on job losers in the context of the unemployment insurance offices. It is unclear whether the JOBS intervention can have similar impacts on other groups of unemployed persons who are not recent job losers, such as persons reentering the job market after long periods of time or for the first time or discouraged workers who are no longer seeking employment. A second limitation arises from the attempts to disseminate the intervention on a broad scale to assess how easily it can be adopted by other social service systems. It remains unclear whether it can be delivered with integrity in less well controlled circumstances.

A detailed intervention manual for the JOBS program is available. A more extensive replication of the research evaluating the impact of the JOBS program is currently under way, and a training manual for replicating the JOBS intervention and copies of research reports are also available.

### Programs Aimed at Preventing Depressive Disorders Among Adults at Risk Because of Poverty and Minority Status

Depressive disorders, referred to here as depression, are a major health problem (see Chapters 5 and 6). Not only is depression one of the most common of the serious mental disorders, but, partly because of stigma and partly because of lack of knowledge regarding its symptoms and the availability of effective treatments, most persons who have the disorder do not receive treatment. This is especially true for certain ethnic minorities and those in poverty. How to reach and support these populations in effective ways represents a major challenge for prevention research and practice. Two pioneering efforts in this area are described below.

The prevalence of clinical depression is between 9 and 14 percent in the general population. Shapiro and colleagues indicated that only 20 percent of individuals meeting criteria for major depression get treatment from mental health specialists (Shapiro, Skinner, Kessler, Von Korff, German, Tischler et al., 1984). This major underutilization of services is even worse for certain groups, such as Hispanics. For example, in the UCLA Epidemiologic Catchment Area (ECA) sample, only 11 percent of Mexican Americans meeting diagnostic criteria for DSM-III disorders had sought mental health services, compared with 22 percent of similarly diagnosed non-Hispanic whites at the same site (Hough, Landsverk, Karno, Burnam, Timbers, Escobar, and Regier, 1987). Not only do certain minority groups underutilize services much more than others, but they also show higher levels of stressful life events and higher levels of depressive symptoms (Roberts, 1987).

Two of the earliest randomized trials investigating prevention of depression in adults included minorities as major segments of their samples. The **San Francisco Depression Prevention Research Project* focused on public sector primary health care facilities as an ideal site for identifying individuals at risk for depression (Muñoz, Ying, Armas, Chan, and Gurza, 1987). Shapiro et al. (1984) found that although only 20 percent of depressed individuals sought mental health care, 75 percent sought other types of health care. Thus the prevalence of depression in primary care populations is much higher than in the

general population. It made sense, then, that persons who were at risk for depression would also seek help there. Given their medical and economic problems, some proportion of those seeking help would be nonsymptomatic but at risk, and others symptomatic but not yet over the threshold into a clinical episode of depression. This randomized controlled preventive trial screened primary care low-income medical patients, the majority of whom were members of ethnic minority groups, identified those who already met criteria for major depression or other mental disorders, and referred them for treatment. Those who did not meet DIS/DSM-III criteria, were not receiving mental health treatment, had been enrolled in the primary care clinic for at least six months, and spoke either English or Spanish were invited to participate in the randomized trial of this selective intervention.

The intervention consisted of a course in cognitive behavioral methods to gain greater control of mood. Doctoral-level psychologists were the instructors, and they followed a protocol (Muñoz and Ying, 1993a). A Spanish-language version was also used. Topics focused on (1) the nature of depression and social learning theory; (2) self-control approaches; (3) how thoughts, activities, and interpersonal interactions affect mood; and (4) how to identify and change those behaviors. The course was conducted in a small-group format with no more than 10 participants per group. The class intervention consisted of eight weekly two-hour sessions.

To date, this is the only randomized controlled prevention trial intended to test whether an intervention could prevent new clinical episodes of major depression. The impact of the prevention project was evaluated in a randomized trial comparing experimental and control group members at 6- and 12-month follow-up periods. Participants in the experimental group had significantly fewer depressive symptoms at both time points. At 12-month follow-up, 4 of the 72 control participants and 2 of the 67 experimental participants met DIS/DSM-III criteria for major depression. The low incidence did not allow sufficient statistical power to test whether the rate of new cases was significantly reduced.

Participants assigned to the experimental group showed the intended changes in the cognitions and behaviors hypothesized to be risk factors for depressive symptoms. Compared with the control group, those assigned to receive the depression prevention course became less pessimistic, had more positive (self-rewarding) and fewer negative (self-punishing) thoughts, and engaged in more pleasant and social activities at one or more follow-up assessment periods. In addition, reductions in negative thoughts and increases in levels of pleasant activity were shown to lead to reductions in depressive symptoms.

Prevention of depression might have additional benefits in terms of reducing utilization of unnecessary medical services. The Depression Prevention Research Project did not find significant differences in medical service utilization between the experimental and the control groups. Further analyses revealed that patients with higher levels of somatization had a greater number of medical visits as stressful life events increased than did nonsomatizers (Miranda and Pérez-Stable, 1993). This suggests that attempts to reduce medical service costs ought to focus on teaching somatizers to cope better with stress. Like most studies of depression, this project relied heavily on self-report data, and outcomes could be made more powerful by adding other sources of data, particularly on the relationship between mood changes and other domains of functioning, such as work or interpersonal relationships. A manual is available for this intervention (Muñoz, 1993a).

Vega and colleagues identified low-income immigrant women of Mexican heritage at consistently high risk for distress and depressive symptomatology (Vega, Valle, and Kolody, in press; Vega and Murphy, 1990; Vega, Valle, Kolody, and Hough, 1987). Ethnographic research identified natural support systems as critical to the well-being of this group. Specifically, the profile of risk that emerged involved both household and extrahousehold factors. Women in the target group typically were experiencing increased burdens and diminished resources, low control, and a sense of personal powerlessness because of chronic economic and social marginality. Their living conditions in families with husbands having unsteady employment or physical handicaps, and the responsibility of caring for large families, placed these women under substantial stress. In addition, most spoke only Spanish, and their social roles were limited to housekeeping.

Counterbalancing protective factors could be mobilized, however. Vega et al. (in press) indicated that emotional and material support, including resource redistribution, transportation, and translation assistance, are all key forms of social support in scarce supply for this population.

**Projecto Bienestar* was aimed at reaching women who were at high risk for depression but currently had mild or no depressive symptomatology (Vega and Murphy, 1990; Vega, Valle, Kolody, and Hough, 1987). The rationale for the selective intervention (Roskin, 1982) argued that attempts to modify the environment by providing opportunities to strengthen individual capacities for coping with critical developmental tasks and unanticipated stressful circumstances could have preventive effects regarding the onset of depression.

Two types of interventions were provided. The first replicated the cultural style of natural helpers (*Servidoras*) found in low-income com-

munities of Southern California and was a one-to-one intervention carried out by these helpers in the community. These natural helpers were trained and supervised by project staff. The second intervention *(Merienda educativa)* was a peer group intervention organized and led by a *Servidora*. Each type of intervention consisted of 12 contacts, but actual exposure varied depending on the group.

Projecto Bienestar was evaluated in a randomized trial comparing the one-on-one and group interventions with a control group over the course of one year. In general, the *Merienda* group intervention showed significant effects that were nonlinear. The one-on-one intervention showed no effects. The results for the group intervention indicated no significant differences between women with low and high baseline levels of symptoms of depression and those in the control group. On the other hand, for women in the middle range of depression scores, the group intervention had clear positive effects, suggesting that there are strong and complex interactions between baseline depression levels and the effect of the preventive intervention. Nevertheless, for women whose baseline depression scores are at midlevel, the group intervention appears to be effective in preventing subsequent depressive symptoms.

The complexity of the findings suggests that this intervention should be tailored carefully, through screening or other means, to particular subpopulations of the general population in question. In addition, these results suggest that further analyses may reveal interesting and informative relationships between baseline depressive symptoms and preventive interventions.

### Program Aimed at Supporting Adult Children Providing Care for Ill Parents

The stressful role of caregiving has been reported to have negative effects on physical (Golodetz, Evans, Heinritz, and Gibson, 1969), social (Cantor, 1983), and psychological well-being (Lawton and Maddox, 1985; Klein et al., 1977; Busse, 1976). Toseland (1990) has reviewed evidence suggesting that various supportive interventions for children of parents needing caregiving can have protective effects against the stresses associated with caregiving for chronic disorders. A variety of research suggests that both peer-led and professional-led support groups may be of value in reducing the stressors associated with chronic caregiving. The target group for these interventions consisted of the adult daughters and daughters-in-law who were the primary caregivers for their parents.

In Toseland, Rossiter, and Labrecque's (1989) preventive intervention, **Peer- and Professionally-Led Groups to Support Family Caregivers*, groups of caregivers met for a total of eight weekly two-hour sessions. Both peer and professional leaders relied heavily on supportive interventions, including ventilation of stressful experiences, expressions of support, and understanding and affirmation of members' ability to cope.

The professional-led sessions followed a two-part protocol including education and discussion as well as problem-solving training. Topics in the education and discussion section included introduction to the support group, caregiver emotions, care receivers' reaction to illness, taking care of oneself, communication between caregivers and care receivers, community resources, medical needs, pharmacology, nursing home placement processes, and managing within the home. A problem solving component involved a six-step model including (1) identifying the problem, (2) anticipating its consequences, (3) identifying its antecedents, (4) generating alternative solutions, (5) evaluating the solutions, and (6) carrying out a plan. Peer-led sessions were less structured and used a self-help approach that emphasized mutual support, the sharing of common concerns, and free exchange of information.

The interventions were evaluated in a three-group randomized trial: (1) peer-led sessions, (2) professional-led sessions, and (3) control group. Both peer- and professional-led experimental groups produced increases in psychological well-being compared with the control condition. Participants in the experimental conditions also reported statistically significant differences with controls in their levels of psychiatric symptoms on the global severity index and the positive symptom index (Toseland, 1990). In addition, results favored the experimental groups in the areas of somatization, obsessive-compulsiveness, and phobic anxiety. Furthermore, participants in the experimental groups differed significantly from those in the control group in social support and in social support network size. Both peer-and professional-led experimental groups also showed higher levels of knowledge of community resources. The patterns of improvement did reflect, to some degree, the nature of the intervention. Peer-led groups spent more time socializing and sharing personal experiences and experienced higher levels of informal social support, whereas professional-led groups tended to focus more on highly structured skills and knowledge.

Follow-up after one year (Toseland, 1990) showed that both peer-led and professional-led experimental groups were more effective than the control group in helping caregivers of frail, older persons reduce the stress of pressing problems, increase formal and informal social supports, and make more personal changes in their caregiving role. The

experimental groups also reported higher levels of interpersonal competence, but the initial differences in mental health symptoms were not observed one year later, indicating that improvements in coping and competence may not be enough to prevent psychiatric symptoms.

Toseland (1990) and colleagues suggested several possibilities for improving the effectiveness of interventions for caregivers. For example, for those already experiencing debilitating psychiatric symptoms, psychotherapeutically oriented treatment interventions may be more appropriate. On the other hand, short-term improvements in social support could be sustained for caregivers without serious psychiatric symptoms if preventive interventions were incorporated by either extending weekly group sessions or making periodic booster sessions available. Local chapters of the Alzheimer's Disease and Related Disorders Association could sponsor such groups.

### Findings and Leads

- The Caregivers Support Program and the JOBS project both found that the interventions were most successful with people who were at highest risk. Projecto Bienestar was most effective, however, with women with midlevel depressive symptom scores. Interventions should be carefully tailored to groups in which they will have the most impact.
- A practical implication of the findings on the JOBS project is that a preventive intervention that both reduces mental health problems and is cost-effective could be implemented at a relatively low cost. In addition, the benefit-cost analyses suggest that the intervention could pay for itself in higher levels of tax revenues in a relatively short period, clearly under one year.
- As a general intervention for those at risk for depressive symptoms, the San Francisco Depression Prevention Project shows the key role of thoughts and activities, thus reinforcing a broad range of research on the relationship between cognitions, behaviors, and mood. The project demonstrates that randomized controlled trials with low-income, public sector primary care populations are feasible, these trials may include non-English-speaking persons, the prevalence of depressive symptoms is very high, and preventive interventions can reduce depressive symptoms. The next step is to carry out a randomized controlled trial with sufficient statistical power (see Muñoz, 1993b, Table 1) to adequately test whether onset of first episode of major depressive disorder can be prevented. Once a clinical episode has occurred, the probability of relapse is very high (see Chapter 5). Therefore research programs should concentrate on the prevention of the first episode.

- The Perceived Personal Control Preventive Intervention Model (Caplan, 1977) is potentially applicable to a wide range of community institutions, including the general hospital. This model could be adapted to a variety of developmental transitions in which the enhancement of coping skills and personal control is important.
- The Caregiver Support Program has been shown to increase coping resources and reduce stress-related symptoms in social service workers. Modifications in the Caregiver Support Program might include providing training to all members of work teams and developing organizational-level reward structures for successfully implementing the program concepts and skills.
- When outcome data are limited to self-report measures, the full impact of the preventive program may not be known. Adding other sources of outcome data, such as from standardized tests or from family members or teachers of the participant, can increase the validity of the findings.

## INTERVENTIONS FOR THE ELDERLY

Old age brings important changes in the social and biological life of the individual, including its own developmental tasks, risk factors, and a need for compensating protective factors. In older persons, work diminishes as a major source of stress and satisfaction, and new challenges emerge. Offspring leave the family, and for some older people the role of grandparent emerges. Retirement becomes a milestone for persons who earned their living outside the home. Perhaps most important, illness in oneself or in one's family or the death of a spouse or other loved ones may produce major life changes for the aging individual.

Developmental challenges that emerge in this period include caring for others, particularly a spouse, coping with severe and incapacitating illness in oneself or in loved ones, as well as coping with loss and death. In addition, maintaining meaningful roles and finding new social roles that give life meaning constitute an important but often ignored developmental task.

Accordingly, risk factors for the elderly include relationship loss and bereavement, chronic illness and caregiver burden, social isolation, and loss of meaningful social roles. On the other hand, protective factors include social support in a wide variety of forms—family, peers, informal relationships, more formal support groups, responsive health and social services such as respite care, and opportunities for new

The prevention programs reviewed in this section address (1) caregiver burden, an important potential risk factor for the elderly and (2) loss of a loved one or spouse, a risk factor that is almost inevitable for the elderly.

### Evidence from a Quasi-Experimental Study: Relieving Caregiver Burden

Elderly caregivers of profoundly disabled elderly spouses and parents face major stressful burdens. Demographic trends make it clear that this burden will increase dramatically as we enter the twenty-first century. (For further discussion of caregiver burden, see the sections on Alzheimer's disease in Chapters 5 and 6.)

Caregivers are more likely than others to experience problems in the areas of social participation and psychological distress. Furthermore, the relationship between the patient and the caregiver, living arrangements, the caregiver's perceived adequacy of social support, and the caregiver's gender are related to the probability of experiencing lower levels of well-being. As George and Gwyther (1988) observed, "there are no data suggesting that the stresses of caregiving place one at risk for psychiatric disorder as defined by conventional diagnostic criteria. Nonetheless, our research results suggest that caregivers are a group at risk for substantial psychological distress" (p. 317).

No randomized controlled trial data are available; most studies in this area have used quasi-experimental design. The *Duke University Family Support Program* (George and Gwyther, 1988; Gwyther and Brooks, 1983) is described here as an illustration of the work that currently exists. It is a quasi-experimental design in a longitudinal survey context. The program consisted of community support groups for the family caregivers and memory-impaired older adults. Three basic functions of support groups were identified: (1) Persons sharing a common problem frequently report the need for more information. Support groups are a potentially useful mechanism for information transfer and exchange. (2) In addition, support groups provide neutral support based on the fact that persons have experienced a specific problem and feel psychologically isolated. They can share experiences, coping strategies, and perhaps a sense of mutual understanding and validation. (3) Finally, support groups in some cases perform an advocacy function, mobilizing community support for their problem, and/or educating the community. This advocacy role can, itself, present therapeutic opportunities by augmenting the range of choices for self-efficacy.

Each family support program group had co-facilitators consisting of

one family caregiver and one professional service provider, who provided access to local agencies with physical and material resources as well as professional expertise. In addition, the development of one-to-one networks was specifically recommended by the family support program, consisting of dyadic relationships between caregivers with common interests.

In evaluating the intervention, George and Gwyther (1988) explicitly focused only on risk factors; they did not measure psychological well-being as an outcome of their intervention. They focused specifically on knowledge of Alzheimer's disease and related disorders, knowledge of available community-based services, use of the services, and feelings of being misunderstood and/or lonely. In addition, the study examined membership in the support group versus no membership.

The intervention had a strong effect on knowledge of Alzheimer's disease and knowledge of community services, but little effect on use of community services. Nevertheless, it also had strong effects on reduction of feelings of loneliness and feelings that no one understands the caregiver's situation. Longitudinal analyses of results substantially confirmed these initial cross-sectional findings with few exceptions. Future studies would benefit from more rigorous methodological design and inclusion of psychological measures of outcomes. A manual for this program is available (Gwyther and Brooks, 1983). In North Carolina, the manual has been supplemented by training sessions for the support group leaders, called support group facilitators.

Other forms of assistance are also needed to ease caregiver burden. Respite care is the service that caregivers desire most but is least available. Respite care involves temporary relief from the responsibility of caregiving and can be delivered as an in-home, day center, or institutional service for periods of time ranging from a few hours to a few days.

### Programs Aimed at Enhancement of Coping with Widowhood and Bereavement

Bereavement is a life event that deserves serious attention in understanding the mental health of persons of all ages (IOM, 1984). Widowhood and bereavement will affect increasingly large groups of the elderly in the coming years. Widows and widowers experience grief, including feelings of sadness, despair, anger, and guilt. They also experience feelings of profound disruption as well as the role loss associated with losing a spouse. After the immediate needs following the death of a spouse have been met, including funeral arrangements,

legal arrangements, immediate social service arrangements, and the initial support from loved ones, the widow or widower is often left alone and is expected by others to recover rapidly. This period of transition, from six weeks to two months after the death, appears to be more difficult than the period immediately following the death.

Many bereaved people will live many more years after their loss, and some are at risk for a variety of problems. Bereavement has been studied extensively as a risk factor, and Marris's (1958) and Parkes's (1965) early epidemiological work suggests that bereavement reactions can increase the risk of depression. Epidemiological research also indicates that conjugal bereavement is associated with higher risk for elevated levels of physical deterioration and death (Lieberman and Videka-Sherman, 1986). In addition, widows and widowers are more likely than single or married peers to be socially isolated, to live in poverty, to be emotionally troubled, and to have fewer meaningful social activities (IOM, 1984).

Protective factors for the bereaved include emotional and social support, higher levels of social engagement and interaction, formation of meaningful new social roles, as well as the opportunity in mutual-help groups for the catharsis and interaction that can lead to personal insight.

**Widow-to-Widow: A Mutual Help Program for the Widowed*, developed by Silverman (1988) as a service program, involves recruiting widowed aides who have some perspective on their own grief and who are in a position to reach out to other widowed persons in their transition state. Widowed helpers were recruited by word of mouth and through local community action programs. Identification of the newly widowed was done through funeral directors, who became involved in Widow-to-Widow programs as sponsors and served on advisory boards. Outreach typically began with a first contact two months after the death. Initial contact was by mail, and the initial social visits later evolved into group discussions.

Vachon and colleagues evaluated the Widow-to-Widow program in a research trial in Toronto (Vachon, Sheldon, Lancee, Lyall, Roger, and Freeman, 1982, 1980; Vachon, 1979). They randomly assigned 162 newly widowed women to control and experimental groups. The intervention consisted of one-to-one support by another widow, practical help in locating community resources, and small group meetings. The intervention was not limited to any predefined duration or phase of bereavement.

Widows who participated in the program were more apt to have begun new relationships and activities and did so more quickly. They also experienced fewer depressive symptoms on a psychiatric screening

instrument than women in the control group. This was particularly true for women who experienced high stress immediately after the death of their spouse. Over the two years of the randomized trial, most women recovered with or without help; however, those receiving the intervention recovered more quickly (Vachon et al., 1980).

The Widow-to-Widow program focused almost exclusively on widowed women. Presumably, such a mutual support program could also be useful for widowed men. Randomized trials of this form of support would provide information about the range of impact of the program and about subgroups at higher risk who could be more likely to benefit from the intervention, but few have been conducted.

The Widow-to-Widow program model seems already to have been widely disseminated through such organizations as the American Association of Retired Persons (AARP). Careful trials to assess which program models would be particularly well suited for dissemination, which individuals would be most likely to benefit, and whether depressive disorders are prevented would be important next steps in the development of these programs.

### Evidence from a Quasi-Experimental Study: Mutual-Help Groups for Widowed Persons

*THEOS*, a national network of self-help groups that aid widowed persons, was the vehicle used to reach widows and widowers in a preventive program addressing issues of bereavement (Lieberman and Videka-Sherman, 1986). The research design, which was complex but quasi-experimental, compared participants in the mutual-help program (experimental group) to a probability sample of widowed persons in a longitudinal data set (comparison group). The experimental group showed improved mental health status over a one-year period, whereas the control group showed deterioration on all mental health measures except depression.

In addition, experimental group members who made strong social linkages in THEOS showed more positive changes on six of the eight mental health measures (depression, anxiety, somatic symptoms, well-being, self-esteem, and mastery) than those who attended meetings but did not develop other social linkages within THEOS.

These results were checked by examining whether high-participation experimental group members were different in other important ways, including having special aptitudes and skills that would account for the establishment of their new social linkages. No important differences were found, with the possible exception that low meeting attenders had

ıewhat lower need-for-affiliation scores. In short, a variety of risk ors associated with social isolation appeared to have been reduced participation in THEOS mutual-help intervention, and a number of ısures of precursor symptoms of mental disorders showed improve- ıt in comparison with a control group.

ieberman and Videka-Sherman (1986) pointed out that their analyses ngly suggest that the mere passage of time could not account for the itive changes observed in the high-participation experimental mem- s. Nor did improvements in mental health scores appear to be simply result of attendance. Instead, a particular type of high-intensity tual support involvement appeared to be the active mechanism of the rvention.

### Findings and Leads

The Widow-to-Widow program was most successful with those nen who experienced high stress immediately after the death of their use. This result suggests increased targeting of this high-risk group. ls are needed to determine whether depressive disorders can be vented.

A variety of naturally occurring mutual-help groups could be rously evaluated to assess their preventive potential, particularly en the mutual-help groups are aimed at aiding persons in coping ı major life transitions, losses, illnesses, or stigmatizing experiences.

## A NEW GENERATION OF DEVELOPMENTAL STUDIES

ecently, a new generation of preventive intervention research stud- have been designed and supported by federal, state, and private rces. These studies have adhered to high methodological standards hold great promise for identifying causality and malleability of vidual and combined risk factors, demonstrating efficacy and effec- ness of single- or multiple-component interventions, and assessing only reduction of risk factors but also reduction of incidence of ıtal disorders. Because this work is still in progress, the programs are reviewed here, but the project titles and investigators are included in reference list. Some of the research to note over the next decade will ıe from investigators such as D. Cicchetti, whose work focuses on venting developmental problems in children with depressed moth- B. Egeland, whose work is with children of high-risk mothers; D. s, who is replicating the Prenatal/Early Infancy Project in Memphis ı a different high-risk sample; J. Coie and N. Guerra, whose

prevention demonstration projects to prevent conduct disorder point the way for combining research methodologies with service programs; T. Field, whose work with high-risk mothers and their babies is showing psychological and physiological benefits from the therapeutic use of touch; W. Beardslee, whose aim is to prevent depression in children and adolescents who have been exposed to parental depression; J. Reid and C. Webster-Stratton, who in separate indicated prevention programs are pushing the boundaries with children who have precursor symptoms of conduct disorder through the application of techniques that have proved successful in treatment settings; and G. Clarke, whose school-based interventions are yielding the first data on prevention of major depressive disorders among adolescents at high risk for depression.

## MAJOR FINDINGS AND PROMISING LEADS

- Although their numbers are relatively small, some excellent illustrations of preventive interventions are available. These illustrations point the way toward further work by highlighting successes as well as problems. The design of new prevention programs should consider such illustrations and adapt methodologies and strategies for intervention accordingly.
- There are data that clearly show that preventive interventions can reduce risk factors that are associated with the onset of many mental disorders. However, as yet, there is no evidence that preventive interventions reduce the incidence of mental disorders. Risk reduction findings are encouraging about the eventual prevention of the initial onset of some disorders, such as major depressive disorder and alcohol abuse.
- The criteria presented here for the assessment of prevention programs that have been completed and published can be a guide for researchers, practitioners, and policymakers as they make critical decisions for this field.
- Although there are numerous prevention service programs throughout the life span, most prevention research programs are targeted to the needs of infants, preschoolers, elementary-age children, and adolescents. There is a nationwide and unfortunate lack of prevention research programs targeted to the needs of adults, especially the elderly.
- Although there are excellent reasons to target an intervention for a specific age or stage of life, and for a particular disorder or problem, there is usually no single intervention at a single point in time that accomplishes comprehensive goals of prevention for a lifetime. The

ultimate goal to achieve optimal prevention should be to build the principles of prevention into the ordinary activities of everyday life and into community structures to enhance development over the entire life span. This would include promoting consensual community values and norms.

- Attention should be given to the potential risks of short-term interventions that are beneficial but are then curtailed or terminated.
- Many prevention programs clearly demonstrate that education, physical health care, employment, and mental health care are not separable. Improvements in one area can affect other areas. A logical extension of this finding is support for collaboration among the agencies and institutions in these domains.
- Risk factors can occur in single or multiple domains, such as home, school, peer group, neighborhood, or work site. When risk factors occur in multiple domains, interventions are required in all of them. Prevention programs from infancy to adolescence have clearly demonstrated the feasibility of multidomain interventions.
- Risk factors can also occur across generations in the same family. The Prenatal/Early Infancy Project has clearly shown that positive outcomes can be secured for both infants and their mothers from a single comprehensive interaction. Prevention programs should take advantage of opportunities to reduce risks, assess outcomes, and compare benefits and costs for members of different generations within a household, such as adult children serving as caregivers for disabled parents.
- Many prevention research programs have similar methodological complications: difficulty in adhering to a strict randomized controlled trial design; high attrition of participants; lack of documentation of fidelity in delivering the intervention; lack of multiple measures of outcomes from multiple sources; and insufficient long-term follow-up, which can prevent the collection of outcome data on incidence of multiple disorders.
- Some prevention programs get scaled up into field trials or quickly become translated into service programs. Others that have positive outcomes and seem to be equally well designed, however, do not. One factor that contributes to the difference is marketing, such as encouraging a school or an agency to use a new program.
- Social competence enhancement has been shown to be a successful intervention with young children. Social competence programs have extended the basic social competence curriculum of Shure and Spivack to address stressors and interpersonal challenges of different developmental periods. Social competence interventions should probably be

included in risk reduction interventions seeking to strengthen resilience in populations at risk for early behavior problems. Again, however, it is important to note that to date, the long-term preventive effects of such interventions on the incidence of most mental disorders is unknown and follow-up studies are needed.

- Prevention research suggests the importance of using interventions beginning in the preschool and elementary age periods to create normative consensual behavior regarding substance use and bullying. With such early intervention, those at risk might be hypothesized to be more committed to the normative standards of the larger community and to be less likely to violate widely shared community standards for behavior.
- The combined evidence suggests that some proportion of conduct disorder may be preventable. Developmentally adjusted interventions in early childhood, during the elementary grades, and in adolescence have been tested and have, in isolated experiments and with some confirmatory data from quasi-experimental studies, shown modest but statistically significant effects in preventing later delinquent behaviors and related indicators of conduct disorder during adolescence. Few of these preventive interventions have used diagnostic criteria to ascertain effects on the incidence of the disorder. Nevertheless, there is promise in several components, including early childhood education, parent training, enhancement of social and academic competence, and school curricula promoting consensual norms antithetical to risk behavior for disorder, such as substance use.
- Interventions that have been highly successful at certain developmental stages, such as home visiting with families with infants and preschoolers, might also be useful at other stages of the life span, such as with the elderly, who may be homebound, and single parents or dual-career parents who cannot work another scheduled event into their lives.
- Service programs can provide good leads regarding intervention, community context, and exchange of ideas. Such programs can also be brought into the preventive intervention research cycle and tested for their effectiveness in reducing psychological symptoms and mental disorders. For example, Healthy Start in Hawaii and Homebuilders provide excellent ideas.
- The combined evidence suggests that a number of programs have successfully focused on prevention of depressive symptoms in adults and the elderly, but data on the prevention of the first episode of major depressive disorder are not yet available, in part because of inadequate sample sizes in preventive trials.

- In general, research on preventive interventions that emphasize an ecological perspective has been neglected. As yet, there are no communitywide prevention research programs that target multiple age groups and attempt to change community norms. Such research has special issues, such as difficulty in randomization. However, for some problems, it may be necessary to foster new consensual values and norms in neighborhoods and communities. Beginning work in the areas of substance abuse and alcohol prevention and in Olweus's program to reduce bullying shows promise.
- Even though biological risk factors have a significant role in the onset of mental disorders, there are few prevention programs other than prenatal care and childhood immunizations that address these factors. As knowledge grows in this area over the next decade, growth in the number of programs addressing these factors is expected.
- Changes in laws and pricing have affected the availability of alcohol and appear to be successful in the prevention of alcohol use. There are also some data to suggest that peer-led didactic curricula can reduce and prevent alcohol use.
- Many prevention research programs are most successful with the individuals within the sample who are at highest risk, but there are many exceptions. Much remains to be learned about tailoring interventions to groups in which they will have the most impact. Consideration will need to be given to benefit-cost issues as well as the potential harmful effects of screening and labeling individuals as being at risk.

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# 8

# Treatment Research and Prevention Research: A Collaborative Frontier

Prevention and treatment are part of a continuum of interventions aimed at reducing the incidence and prevalence of mental disorders, but they have different targets and purposes (see Chapter 2). Treatment interventions attempt to alleviate or eliminate an episode or delay recurrence of a mental disorder among identified patients who have met the full criteria for diagnosis. Preventive interventions are aimed at preventing or at least delaying the onset of a mental disorder among persons who have not yet met these criteria and therefore are not yet classified as patients. One heuristic reason to view treatment and prevention on a continuum derives from the potential value of extrapolating knowledge gained from one area of intervention research and applying it to the other.

Treatment intervention research and preventive intervention research are similar in several respects. They share a knowledge base, and the core sciences that support prevention and treatment have been instrumental in the advancement of both fields. Using the best available scientific methods, researchers in both fields increasingly are evaluating the efficacy and effectiveness of interventions, thus providing more information for community practitioners. Also, both treatment and prevention research continue to try to recruit competent scientists to their respective fields in the face of inadequately funded training programs (see Chapter 12).

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Commissioned papers for this chapter were prepared by J. Asarnow and R. Koegel and by S. Glynn, K. Mueser, and J. Herbert, and are available as indicated in Appendix D.

Effective psychosocial and pharmacological treatments are now available for many of the mental disorders in DSM-III-R (Kaplan and Sadock, 1989; Karasu, 1989; Dobson and Shaw, 1988; see also Chapter 5). When these treatment interventions are used, they can substantially reduce the morbidity, chronicity, and disability of mental disorders. One justification for mining the principles grounded in treatment intervention research to learn lessons for designing, conducting, and analyzing preventive intervention research programs is that preventive interventions and treatment interventions are often based on similar multifactorial causal models. Therefore it is possible that if a particular treatment intervention is effective for treating an already developed mental disorder, the same or a similar intervention may be effective in preventing the disorder in individuals who are at high risk. Moreover, even if the preventive intervention fails to prevent the onset of the disorder, it may delay onset or may lessen the severity of the disorder. Many treatment interventions aimed at enhancing protective factors, such as literacy and academic and social skills, are generic and not specific to any one mental disorder, and they are good in and of themselves. They may also provide beneficial effects when used in preventive intervention research programs, regardless of how critical they may be in actually preventing a mental disorder.

In this discussion, as in the rest of this report, the terms *intervention program* and *intervention trial* are carefully delineated. The intervention program is the activity or activities provided to the targeted population. Its design includes considerations regarding the timing, duration, and environment of those activities, as well as the interveners involved. The intervention trial is the research component designed with experimental and methodological protocols to analyze and validate the success of the intervention program. *Intervention research program* is the inclusive term for the program plus the trial.

Principles and lessons that can be shared between treatment intervention research and preventive intervention research are listed and described in this chapter. The list is illustrative, rather than exhaustive, and the principles and lessons fall into several categories according to the main concept to which they apply. The categories applicable to the design of intervention programs include risk and protective factors and etiological chains; co-morbidity of disorders; progressive course of maladaptive behavior; individual differences; multimodal interventions; timing, duration, and environment of interventions; and the effects of interventions on family members. Principles and lessons applicable to research methodology, ethical and cultural concerns, and dissemination are also presented. The suggestions in this chapter regarding transla-

tions from treatment to prevention are made with cautious optimism and the realization that only a growing body of empirical trials of preventive interventions can validate the applicability of these considerations.

## INTERVENTION PROGRAM DESIGN

### Risk and Protective Factors and Etiological Chains

Treatment interventions have been developed from knowledge of risk and protective factors that influence the course and outcome of mental disorders; likewise, preventive interventions have been developed from knowledge based on risk and protective factors that affect the onset of mental disorders. Some of these risk and protective factors are undoubtedly the same for treatment and prevention, and some are undoubtedly different. Research on the factors thought to be associated with onset of disorders—and thus of particular interest in prevention—and on how and where they fit within causal models is still at an early stage (see Chapter 6). Nevertheless, treatment research involving risk and protective factors affecting the course of disorders can provide additional insight. For example, many treatment studies have shown that when language, communication, and social skills are improved—giving individuals more functional control in their environments—disruptive, aggressive, self-injurious, and stigmatizing behaviors can be greatly reduced (Liberman, 1988). This consideration may have utility in prevention of stress-induced onset of disorders whose precursors include information-processing deficits.

As described in Chapter 2, risk factors that function as precursor signs and symptoms of a disorder can be used in indicated preventive interventions to target individuals at high risk for onset. Currently, whether those risk factors were part of the prodrome of the disorder can be known only in retrospect, after onset. Identification of prodromal phases could facilitate use of a treatment intervention to push the boundaries from treatment into an indicated prevention, which, because of its proximity to treatment on the intervention spectrum for mental disorders (see Figure 2.1), is where lessons from treatment are likely to be most applicable.

In the course of schizophrenia, for example, delay in treating the early stages of the disorder leads to maladaptive coping strategies by families and patients, the appearance of negative symptoms, refractoriness to drug therapy, social withdrawal, and greater chronicity. A treatment demonstration project in England by Falloon and colleagues docu-

mented a decrease in the prevalence of chronic schizophrenia when early detection and treatment intervention were provided by mental health teams working closely with general practitioners to reduce the duration and intensity of the disorder (Falloon, Shanahan, LaPorta, and Krekorian, 1990). Falloon reported reductions in chronic schizophrenia following an intervention that focused on individuals showing early stages of schizophrenia. Key features of this treatment intervention were (1) the identification of individuals hypothesized to be at risk to move further down the pathway to a chronic schizophrenic disorder, at a point relatively close to the disorder onset; (2) the use of proven, multimodal interventions, including both pharmacological and psychosocial components; and (3) integration of the treatment program within the primary health care and family systems (Falloon, 1992). Thus one prospect for a preventive intervention research program for schizophrenia might be to offer education on the early warning signs of psychosis in middle and high schools and colleges to students, parents, and teachers, as well as through the mass media, so that early identification of precursor signs and symptoms with a high likelihood of leading to the onset of disorder would lead to early indicated prevention, including psychosocial interventions for the individual and his or her family. However, the prevalence of schizophrenia is only 1 percent, and there are considerable dangers in the effects of labeling false positives, so the initiation of such a program would have to be considered very carefully.

Another example of using treatment interventions to push the boundaries from treatment into indicated preventive intervention is in the area of depression. DeRubeis, Hollon, and colleagues have reviewed evidence from studies that have followed up patients who were treated for depression (Hollon, DeRubeis, and Seligman, 1992; DeRubeis, Evans, Hollon, Garvey, Grove, and Tuason, 1990). Overall, the relapse rates for patients who received cognitive therapy were considerably lower than for those who received pharmacotherapy. Thus cognitive preventive interventions might help avert a first episode of depression, especially in individuals with precursor symptoms.

With the development of reliable and sensitive means of detecting prodromal phases of a disorder, the current public education programs on recognition and treatment of depressive and anxiety disorders, sponsored by the National Institute of Mental Health (NIMH) (e.g., NIMH Panic Disorder Campaign (NIMH, 1991)) could be expanded to include identification and preventive intervention of early precursors associated with these and other mental disorders. Information regarding the early precursors of panic and agoraphobia (such as an initial, transient panic experience) could be provided to the public through

radio, television, and newspaper "health messages." Such an educational campaign might result in early identification and indicated preventive interventions, such as cognitive-behavioral approaches for the individual and his or her family, before the full syndrome develops. A research trial could be developed to determine the efficacy of such an approach.

### Co-morbidity of Disorders

There is a high rate of co-morbidity in mental disorders. Half of persons with mental disorders have more than one diagnosis (Wolf, Schubert, Patterson, Grande, Brocco, and Pendleton, 1988). Furthermore, three out of four individuals with substance abuse disorders are also diagnosed with another mental disorder (Ross, Glaser, and Germanson, 1988). Data from the Epidemiologic Catchment Area study show that approximately half of mental disorders in the United States occur in persons with a history of some other mental disorder (Robins, Locke, and Regier, 1990).

Treatment research has found that one disorder (the primary disorder) usually occurs at an earlier stage than the other disorder(s) (typically described as secondary). For example, co-morbidity between anxiety disorders and substance use disorders has been found in a number of clinical studies (Roy, DeJong, Lamparski, Adinoff, George, Moore et al., 1991; Chambless, Cherney, Caputo, and Rheinstein, 1987), with phobias almost always preceding substance abuse (Christie, Burke, Regier, Rae, Boyd, and Locke, 1988; Hesselbrock, Meyer, and Keener, 1985; Weiss and Rosenberg, 1985). Klein (1980) suggests that co-morbidity between primary phobia and secondary substance abuse is traditionally attributed to anxiety, which leads to the use of alcohol and drugs as a form of self-medication. This interpretation has been supported by reports that the majority of patients with phobias consciously use drugs and alcohol to manage their fears (Bibb and Chambless, 1986). Other examples of a primary disorder leading to a secondary one include cocaine, marijuana, and amphetamine abuse triggering schizophrenia, panic disorder predating agoraphobia, and dysthymia being followed by major depression.

This evidence on co-morbidity of mental disorders suggests several rationales for preventive intervention research (Kessler and Price, in press). First, when one disorder causes or leads to a second, prevention of the first disorder is a plausible preventive strategy for the second. Preventing the onset of an initial primary disorder could, in principle, reduce the number of lifetime cases of other mental disorders and the

Thus preventive interventions aimed at preventing the initial disorder should include outcome measures that assess effect incidence of multiple disorders. Second, when precursor s symptoms of a primary disorder are identified, preventive inter should focus not only on the prevention of the primary disorde on the other likely co-morbid disorders that could develop. For a program to prevent anxiety symptoms from developing into should be accompanied by preventive strategies to decrease th tial for substance abuse. This might be done by weakening or ing causal pathways from the first set of precursor symptom primary disorder to a likely set of precursors for a second diso could develop. Third, possible causal mechanisms linking two disorders provide a special opportunity for both prevention logical research. Interventions aimed at common causes may re incidence of two or more co-morbid states. Finally, individuals at high risk for a mental disorder because of their having a physical disorder may benefit from preventive interventions. F ple, individuals recovering from a myocardial infarction or artery graft surgery—one half of whom can be expected to d depressive disorder—would be prime candidates for prevent ventions, especially if they have had precursor symptoms of de (Brown, Munford, and Munford, 1993).

### Progressive Course of Maladaptive Behavior

Treatment research has documented strong associations children with dysthymic disorder, a persistent depressive c and the subsequent development of major depression (Kova berg, Crouse-Novak, Paulauskas, and Finkelstein, 1984a; Kova berg, Crouse-Novak, Paulauskas, Pollock, and Finkelstein, 198 wise, the early appearance of low levels of disruptive behaviors inattention to classroom or home rules, in young children can to full-blown oppositional, conduct, or antisocial disorders that at a later age (Koegel, Camarata, and Koegel, 1992; Loeber, Br and Green, 1990). In a similar manner, patterns of seeking atter social validation and avoiding challenging or anxiety-provoki tions in childhood may establish behavioral trends that can esc mental disorder at a later stage in life. Thus it would app preventive intervention research would need to separate n from abnormal developmental patterns of behavior and focus inating or reducing those elements in the social environm reinforce abnormal modes of coping and adaptation.

## Individual Differences

Treatment in most areas of medicine has been guided by an appreciation of the special needs and responses of the individual patient. In treatment research the focus is often on which type of treatment is best for individual patients with specific mental disorders. Contributing to individual differences are the underlying gene-environment risk patterns and the role they play in etiology and the availability of social and other environmental resources.

One type of treatment intervention design that recognizes the importance of individual differences is the modular approach, which offers discrete elements of the intervention incrementally, in a hierarchy beginning with interventions that are least costly and intrusive to the subject population, depending on each individual's needs and responses (Liberman, Mueser, and Glynn, 1988; Liberman, 1981; Lazarus, 1974). For example, a wide range of modules have been developed for individuals with chronic mental disorders. The modules help teach skills in conversation, money management, home finding and maintenance, and medication self-management. Each identified skill area has specific, targeted behaviors for training (Liberman, 1988).

The modular approach has three primary advantages for treatment. First, it permits considerable latitude in designing a program to fit the specific needs of a given individual, while ensuring that some core elements are consistently applied to all. This approach depends on defining which subgroups will respond to which interventions. An eclectic approach can be developed, using modules that draw from cognitive, social, behavioral, and pharmacological domains.

Second, the modular approach can achieve greater efficiency in cost-effectiveness through providing only as much intervention as is needed and desired. Some targeted individuals may require many months or even years of intervention, whereas others may show the desired change in risk factors with a minimal, brief intervention.

Third, the modular approach fits well with a competence-based approach to intervention. Because many intervention programs aim to enhance skills that confer protection against risk factors—both enduring psychobiological vulnerabilities in the individual and stressful life events—monitoring the acquisition of skills in the targeted population can reveal the point at which incremental, modular intervention has achieved its objective in any one individual. In a like manner, preventive interventions that are flexible and tailored to individual needs may yield better results than a preventive intervention that attempts to change all targeted participants in much the same way with much the same type,

intensity, and duration of intervention. Preventive interventions should take cognizance of individual differences in the degree to which participants are "at risk," possess personal or environmental protective factors, and display readiness for intervention.

## Multimodal Interventions

The complexity of mental disorders has led to the use of multimodal treatment interventions including pharmacological and psychosocial-behavioral approaches. These combined approaches have tended to be more effective than either alone (Kaplan and Sadock, 1989; Karasu, 1989). Such combined biopsychosocial interventions also may be more effective than unidimensional interventions in prevention trials.

Before considering the use of pharmacological agents in prevention, the benefit-risk ratio of such a strategy must be carefully weighed. There are several reasons to limit the use of pharmacological agents in prevention programs that have children and adolescents as participants. First, the efficacy of drug therapy for many mental disorders in children is not well documented. Second, the adverse side effects of psychoactive drugs, especially on physical and mental development, may be greater for youths than for adults. Third, the potential for stigmatization may be greater when medications are used.

Some medications have proved effective in alleviating symptoms of some mental disorders and in forestalling relapse. Therefore it may be reasonable—but only with adults, not with children—to study the potential of these psychotropic drugs for preventing or delaying the onset of a disorder if administered to individuals who have precursor signs and symptoms and are at extremely high risk for the disorder. However, this is an extremely controversial issue. Even with adults, benefit-risk ratios for medication strategies must be carefully weighed. Medications with serious and frequent side effects would probably exceed a threshold considered acceptable. In indicated preventive interventions, knowing that an individual is entering a high-risk period for the development of a mental disorder might justify the administration of a psychotropic medication known to be effective with the disorder of concern. The amount of medication could be titrated downward to a subclinical, yet potentially effective, preventive dose in individuals who have shown precursor signs or symptoms of the disorder. Thus judicious administration of antidepressant and antipsychotic medications might find a place in the prevention of depressive and schizophrenic disorders among individuals at extremely high risk for developing these illnesses. This pharmacological preemptive strategy has been used to

eat toxic, drug-induced psychoses in individuals thought to be at risk r schizophrenic disorder (Machiyama, 1992). Similarly, rapid treatent of serious panic symptoms with pharmacotherapy and cognitive ehavior therapy might prove effective in preempting the development agoraphobia.

### Timing, Duration, and Environment of Interventions

The timing of interventions may be critical to success. For example, arent training with parents of conduct disordered children has been own to be effective in producing clinically significant behavior changes children up to age 12½ (Dishion and Patterson, 1992). However, that search has also shown that parents of older children are more likely than arents of younger children to drop out of the intervention before mpletion. The importance of intervening during sensitive periods, efore precursor problem behaviors become rigidly set, is highlighted by e disappointing results of intensive and long-term residential social arning therapy for predelinquent boys. Even though there were efficaous results while the youth were living under close supervision (Phillips, illips, and Fixsen, 1971), long-term follow-up studies failed to document significant effect of the social learning therapy on emergence of delinuency and other antisocial personality traits. It has been suggested that gression crystallizes around age 8 and that preventive interventions ould start before then (McCord and Tremblay, 1992). Both sets of ndings suggest that providing parent training in early childhood is likely be more successful in reducing the prevalence of child conduct oblems than is delaying intervention until middle or late childhood, hen oppositional and aggressive behavior patterns have stabilized oeber and Dishion, 1983).

Duration of interventions may also be critical. The achievement of evention of mental disorders based on short-term interventions is nlikely to be successful. The literature on treatment intervention search repeatedly shows that the impact of a time-limited treatment nds to be diluted and lost over time because of subsequent intervening opsychosocial events, natural living environments, and other transacons between individuals and their social settings (Forehand, 1992). eally, to sustain the progress derived from the initial intervention, evention programs need a developmental perspective, with an integrated and comprehensive series of age-specific interventions timed to hance and sustain healthy adaptation and skills and prevent dysfuncon at multiple points over the life course. Successful interventions will eed to have a sustained source of funding.

To achieve durable and generalizable effects from preventive interventions, the use of long-term strategies with the continuous or intermittent infusion of elements of the prevention program will need to be carefully considered. These may include the use of "booster" programs or the involvement of natural helpers (such as parents, caregivers, teachers, and peers) to ensure that the individual's social environment will continue to reinforce and strengthen the targeted protective factors. Many effective psychosocial and behavioral treatments have employed natural helpers instead of professional therapists to deliver the interventions (Stein, 1992; Falloon, 1988; Tharp and Wetzel, 1979). Involving natural helpers bearing close relationships with the targeted high-risk individuals may be fruitful in the delivery of preventive interventions as well, especially because these often take place in naturalistic, nonclinical community settings.

With regard to the site of the intervention, Webster-Stratton's (1992) findings from treatment research suggested that low-income, young, single mothers of infants and toddlers were the least likely group to profit from a video-assisted intervention program administered in a clinical setting. These young mothers, constrained by lack of mobility and babysitters, might have responded better to treatment delivered through home visits. In another example of the importance of choice of site, soldiers who have experienced "combat fatigue" or stress syndromes have been treated with combined pharmacological and exposure-in-vivo approaches as close to their front-line positions as possible, rather than in far-off hospitals (Rahe, in press), with the aim of returning the soldiers to duty as quickly as possible. Preventive intervention programs also may have different levels of participation and effectiveness depending on where they are delivered.

Treatment research has illustrated that behaviors and skills transfer to novel environments and demonstrate durability if programming for generalization is a part of the intervention (Liberman, McCann, and Wallace, 1976). Generalization requires specifically linking the intervention in one setting to other situations involving peers, family, school, and work. Generalization techniques include

- gradually "fading" the intervention (such as gradually reducing social reinforcement from the teacher for appropriate social behavior from almost continuous to very intermittent);
- using in vivo interventions (such as teaching the child at risk for conduct disorder to verbally negotiate conflict situations with peers on the playground);
- making the interventions relevant to the participant's natural

environment (such as, while coaching unemployed persons at risk for depression on job interviewing skills, making sure that the person role playing the employer accurately represents a coldly rejecting interviewer as well as a congenial interviewer, or having a person at risk for alcoholism use drink-refusal skills in a variety of environments, such as restaurants, bars, and homes, and in response to overtures from bartenders, peers, family members, and strangers);

- overlearning (such as requiring repetition when teaching discriminations or skills); and
- self-instruction and self-management (Eckman, Wirshing, Liberman, Marder, Johnston-Cronk, Mintz, and Zimmerman, 1992; Dobson, 1987).

Other strategies to increase durability include the use of "booster" programs. Pharmacotherapists have documented and accepted the need for "maintenance" drug treatment for chronic and recurrent mental disorders. However, a double standard applies in clinicians' thinking about continuing an indefinite psychosocial treatment for a chronic mental disorder. If the pharmacological treatment is withdrawn and the patient relapses, the treatment is viewed as efficacious; on the other hand, if the psychosocial treatment is withdrawn and the patient relapses, this is considered evidence that the treatment is ineffective. The importance of prolonged, maintenance, and booster treatments for serious and chronic mental disorders has recently received greater recognition, and it is likely that preventive interventions will also increasingly be designed with these attributes.

### Intervention Effects on Family Members

Interventions with one family member have been shown to have salutary effects on other family members. For example, treatment delivered to patients with diagnosed mental disorders not only helps to reduce relapse and improve the functional status for the patients directly served, but also reduces the emotional burden, dysphoria, and risks of mental disorder for family members and other caregivers deriving from the untreated mental disorder of the patient (Falloon, 1992; Harris and Bruey, 1988; Zarit, 1988; Falloon, Boyd, McGill, Razani, Moss, Gilderman, and Simpson, 1985). For example, treatment or maintenance interventions for a depressed mother might reduce the emotional risks for her child. Similarly, preventive interventions with a parent, sibling, or child might also reduce risks for other family members, but unless these potential positive "side effects" are anticipated, opportunities to measure them will be lost.

## METHODOLOGICAL RESEARCH ISSUES

Treatment research has advanced in the past decade through of rigorous, controlled clinical trial methodology (Karasu, 199 have been carefully designed, conducted, and analyzed. The has been hypothesis-driven, including a focus on the role of protective factors in the onset and course of the disorder (Li 1986). When treatment trials have concluded, patients have lowed up to determine the full effects of the intervention.

Treatment fidelity has been improved through the use of op alized therapy manuals (Liberman, 1993). Until treatment progressed to the point where therapy manuals became prerequ NIMH funding, it was impossible to compare the results of s psychotherapy conducted by different investigators, therapi academic centers. With the advent of these manuals, therapis ensure fidelity of the subsequent replication and coopera collaborative multisite studies (Wallace, Liberman, MacKain, B and Eckman, 1992).

Many of these same research principles are being applied to tion trials. Preventive intervention research should be hyp driven, with specification of the linkages and intervening mec through which the interventions are expected to affect identi and protective factors and mediate delay or prevention of d Participants in prevention trials should be followed up for long periods to determine the full effects of the intervention on the able disorder(s). Fidelity can be increased through the use specified and replicable written manuals that clearly spell c aspects of the intervention can be adapted to meet the needs of cultural, socioeconomic, and age groups.

## ETHICAL AND CULTURAL CONSIDERATIONS

In the design of an intervention program, and of the methodology necessary to test its efficacy and effectiveness, c needed to guard against unintended negative effects. A pillar in delivery of health care is "do no harm." Unfortunately, t research has resulted in examples of untoward iatrogenic effe both pharmacological and psychosocial interventions (Flana Liberman, 1982; Gutheil and Appelbaum, 1982). The mecha action and long-term effects and side effects of many of our cological and psychosocial treatments remain to be clarified particularly true during childhood, when many biological, ps

ical, and social systems are developing rapidly. Similarly, as mentioned earlier, applying diagnostic labels at an early age, although sometimes helpful, can stigmatize a child or adolescent, resulting in detrimental school and peer interactions that, in themselves, may produce psychological disorders (Dodge, 1983). Treatment research has shown many times that diagnostic classifications and treatment techniques must be modified and adapted to meet the special needs of culturally diverse population groups (Mezzich, Kleinman, Fabrega, Good, Johnson-Lowell, Lin et al., 1992). Failure of prevention researchers to address these needs can increase the risks of inadvertent adverse effects of preventive interventions or lack of positive effects.

Even emotionally supportive interventions have been found to produce mixed effects. The Cambridge-Somerville project, initiated in 1935, was designed to prevent delinquency, alcoholism, and mental illness by intervening with an experimental group composed of a sample of "troubled" and average boys in working-class neighborhoods. In retrospect, it is not clear whether this project would today be classified as a treatment or an indicated preventive intervention. Nevertheless, the lesson it provides remains of concern today. These boys were matched to a control group, with five years of biweekly visits by social workers for counseling and assistance with family problems (McCord, 1992). The experimental group also received tutoring, access to social and community programs, and medical and psychiatric attention. A 30-year follow-up found that almost twice as many individuals in the experimental group as in the control group had adverse outcomes, including criminal behavior, alcoholism, and serious mental disorder (McCord, 1992). These negative effects of the well-meaning intervention may have been the result of the labeling of youths who received the clinical intervention, leading to a self-fulfilling prophecy of "mental illness" or "deviance." Alternatively, there may have been inadvertent social reinforcement of early signs of deviance by the professional human service workers over the five years of intervention.

Adverse effects of universal preventive interventions that are issued through the mass media or school-based programs also may occur. For example, it is possible that some educational campaigns designed to reduce substance abuse, smoking, or hazardous sexual behavior could actually produce higher levels of these behaviors than were found in control groups. In particular, media-based campaigns may backfire when targeted to individuals who are at high risk for disorders.

## DISSEMINATION ISSUES

Experiences from efforts to disseminate findings from ef treatment research programs to practitioners can enhance the p for successful adoption of innovative prevention methods. In t research, traditional dissemination methods, such as journal art conferences, have had serious limitations because so few prof are able to translate this information into clinical practice Liberman, and Kuehnel, 1986; Norris and Larsen, 1976; Gar Griffith, 1971; Havelock, 1969). Factors that have appeared to the use of clinical treatment innovations by practitioners inclu personal contacts between potential adopters and those knowl about the innovation, outside consultation on the adoption organizational support for innovation, persistent champion agency staff, and effectiveness and adaptability of the innovat rigan, MacKain, and Liberman, 1993; Backer et al., 1986). Thes learned by treatment researchers certainly could be applied to th more effective methods of dissemination and widespread publi tion of the results of prevention research.

## FINDINGS AND LEADS

- When precursor signs and symptoms of an initial primary are identified, preventive interventions should focus not onl prevention of the primary disorder but also on the other likely c disorders that could develop. Outcome measures should be used intervention effects on the incidence of multiple disorders.
- With the development of reliable and sensitive means of prodromal phases of a disorder, treatment intervention techni be used in indicated preventive interventions for individuals at for developing a disorder.
- Preventive interventions should be tailored to take cogn individual differences in the degree to which participants are possess personal or environmental protective factors, and disp iness for intervention.
- Preventive interventions should aim to achieve durable eralizable effects. Long-term strategies may include the use of sessions and the involvement of natural helpers from the inc social environment.
- Preventive interventions with one individual can have effects on other family members. Benefit-cost and cost-effe analyses would do well to consider these other outcomes.

- Preventive intervention programs can have powerful effects. It is imperative, therefore, to be alert to inadvertent adverse outcomes.
- The usefulness of viewing treatment and prevention as part of a spectrum of interventions for mental disorders, instead of in opposition to each other, is apparent. Many principles that have emerged from research in one area can be borrowed, fully formed, for use in the other. Over the next decade, the cutting edge for progress will lie in the development of mutual respect, equal opportunity, and pragmatic collaboration among the scientists and advocates in the prevention and treatment fields.

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# 9

# Mental Health Promotion

To this point in the report, the emphasis has been on decreasing risk factors and increasing protective factors with the ultimate goal of reducing numbers of new cases of mental disorders. But health" is not simply the absence of disease. Indeed, recent reports Mechanic, 1991, 1986) indicate that people have a much broader oncept of health that includes successful physical and psychosocial unctioning and encompasses spiritual growth. For example, answers to ne common question, "In general, would you say your health is xcellent, good, fair, poor, or bad?" actually encompass comprehensive nd integrated concepts of health. The responses to such subjective ssessments of health status not only tend to be given within a holistic ame of reference that may not sharply distinguish between physical nd psychological aspects of the respondent's health (Eastwood, 1975), ut also go beyond the presence or absence of disease. They tend to ncorporate appraisals that relate to the development and sustenance of e concept of self—including individual competence, activity, and elf-efficacy (Mechanic and Hansell, 1987).

The importance of this more complex view of health, for programatic as well as theoretical purposes, is underscored by a strong link etween the subjective assessment of health status and many health neasures, including mortality (Idler, 1992; Ware, 1986). Specifically,

his chapter is based in part on a commissioned paper by N. Dinges, available as indicated Appendix D.

several studies that have controlled for other risk factors have observed large differences in mortality over significant follow-up periods between those individuals who rated their subjective health status as excellent and those who rated it as poor (Idler and Kasl, 1991; Idler and Angel, 1990; Kaplan and Camacho, 1983; Mossey and Shapiro, 1982). If such assessments can predict something as basic as survival, then future preventive intervention efforts cannot afford to ignore the multidimensional nature of health, especially in terms that move beyond an exclusive concern with disease models and an artificial dichotomy between physical and psychological health.

With this expanded concept of health in mind, the present chapter embarks on a different line of inquiry from that pursued earlier in the report. Here the focus on pathology and the attendant risk-oriented approaches to preventive intervention momentarily is set aside, and the discussion turns instead to the state of the art of research and intervention specific to promoting mental health. As explained in Chapter 2, mental health promotion activities are offered to individuals, groups, or large populations to enhance competence, self-esteem, and a sense of well-being rather than to intervene to prevent psychological or social problems or mental disorders.

In many respects, the goals of decreasing risk and increasing protection in the disease-oriented model and the goals of promoting mental health are not mutually exclusive, either in practice or in outcome. There is also overlap in the techniques used to achieve these goals. For example, cognitive and behavioral interventions frequently are employed to prevent depression by reducing anger, regulating anxiety, and increasing positive cognitions (Lewinsohn, Hoberman, and Clarke, 1989; Muñoz, Ying, Armas, Chan, and Gurza, 1987). Likewise, the same cognitive and behavioral techniques may characterize attempts to enhance personal harmony and well-being (Walsh, 1992; da Silva, 1990). Consequently, it sometimes may be difficult to distinguish the pursuit of prevention from the pursuit of promotion; moreover, achieving one can result in the other. However, there are enormous differences, conceptually and philosophically, between these two goal orientations that must be recognized. Such differences have far-reaching implications for how people talk about these endeavors, why they participate in them, what they expect to gain, and the manner and extent to which they are willing to support them.

Mental health promotion represents the logical extension of the intervention spectrum depicted in Figure 2.1, yet it remains separate, outside of the illness model. It encompasses matters of individual as well as collective well-being and optimal states of wellness (Chopra,

91; Stokols, 1991; Travis and Ryan, 1988; Ardell, 1986). Substantial esources—public as well as private—are currently being expended in ne attempt to promote mental health. The expenditures are almost ertainly large, perhaps similar in extent to the prevention research and ervice programs reviewed elsewhere in this report, but there has been o accounting. Programs, many of which are cited below, exist in chools, health service organizations, businesses, industries, and mu- icipal governments. Other, perhaps not so apparent, examples can be ound in religion, recreation, and physical exercise, all of which can be sed to enhance mental well-being. The enthusiasm of commitment to uch activities is infectious; personal testimony in regard to success bounds. Yet careful, rigorous examination of the efficacy, let alone the ffectiveness, of these activities and of their associated costs and benefits as not yet been conducted. Thus the development of a scientific body f knowledge in regard to mental health promotive interventions epresents a truly pioneering labor. Toward this end, the committee ffers a review of the field as a foundation on which to build and raises number of questions as a blueprint for progress.

## CONCEPTUAL UNDERPINNINGS

Chapter 1 describes several of the problems involved in identifying, efining, and classifying mental disorders. There is, unfortunately, even ess clarity about and little common nomenclature for discussing mental ealth and well-being. The reasons for this discrepancy are intriguing nd include socioeconomic (Starr, 1980) as well as cultural (Kleinman, 988; Manson, Tatum, and Dinges, 1982) factors. Although deserving uller study, such analysis is beyond the immediate purview of this hapter. However, scholars have attempted to define this domain.

One of the major theoretical forerunners of the contemporary litera- ure on psychological well-being is found in work on the dimensions of ositive mental health and the related concept of happiness (Bradburn, 969; Jahoda, 1958). The initial writings focused on the individual traits hat were thought to define the mentally healthy person (Heath, 1977; ahoda, 1958), which evolved from enumeration of core characteristics to nore complex schemas that attempted to describe similarities in the imensions that characterize well-functioning individuals, families, roups, and organizations (Adler, 1982). The original concepts of ositive mental health and psychological well-being have further volved to include the closely related constructs of competence, self- fficacy, and individual empowerment (Bandura, 1992, 1991; Sternberg nd Kolligian, 1990; Swift and Levin, 1987). A recurrent element of such

institutions must ensure their own basic survival. Taken by itself, t
concept of "culture" is inadequate because it lacks a theory of motiv
tion to account for cultural behavior. The concept of the self-imag
when combined with cultural behavior, provides just such a motivati
concept.

The importance of self-esteem maintenance and enhancement h
achieved a broad disciplinary acceptance as a unifying concept, helpi
explain behaviors intended to attain psychological well-being. Th
desire to sustain self-esteem may partly explain why humans perceive
as a threat to be defined as an object (Kelman, 1975), and thus th
motive may be the source of efforts in contemporary empowerme
movements. Obviously, such movements owe much to the se
actualization principles of the past decades of humanistic psycholog
Contemporary theorists have expanded these earlier views to a conce
tual framework of self-esteem as a cultural construction (Solomo
Greenberg, and Pyszczynski, 1991). However conceived, there is lit
doubt that self-esteem has attained considerable importance in t
thinking that informs mental health promotion efforts (Mecca, Smels
and Vasconcellos, 1989).

Although the motives of self-esteem and mastery have been at t
forefront of these developments, other concepts have appeared a
received fleeting attention, only to disappear for lack of sufficie
empirical verification or perhaps for lack of theoretical credibility. F
example, the notion of trauma/stress conversion—which refers to t
transformation of a painful, distressing, or shocking experience into o
that induces strength and resiliency (Finkel and Jacobsen, 1977; Fink
1975, 1974)—enjoyed a brief exposure before being overwhelmed by t

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apparently more theoretically compelling complexities described in the literature on the stress-coping process. The idea that successfully coping with an objectively traumatic event could lead to personality strengths continues to have some appeal and is included in some models of the stress-coping process (IOM, 1982; see also the commissioned paper by Glynn, Mueser, and Herbert, available as indicated in Appendix D). But the potential for positive outcomes has been overlooked while attention has focused on negative effects (Zautra and Sandler, 1983).

Even less well received, if not actively scorned by many mental health professionals, have been proponents of the "transformative" health movement (Walsh, 1992; Grof and Grof, 1989; Tart, 1989, 1975; Wilber, Engler, and Brown, 1986; Walsh and Shapiro, 1983; Ferguson, 1980; Walsh and Vaughan, 1980), who have written extensively from a humanistic and "transpersonal" psychology perspective. This movement emphasizes the holistic nature of the human condition and sees it as inextricably rooted in social context. Its proponents argue that, by systematically focusing attention on the interplay of spiritual, physical, and psychological dimensions of everyday life experience, individuals can recast their sense of self, to the benefit of themselves and others.

Other theoretical contributions have focused on less sweeping, but nonetheless important, aspects of what seems to be an unlimited human need to think well of oneself by whatever means are available. The New Age forms that this need sometimes takes today can mask the perennial essential human striving that underlies it. Whether mundane or transcendent in purpose, the concept of self-esteem remains at the core of cultural behavior and manifests itself according to prevailing norms of the day. Contemporary forms of mental health promotion are thus now beginning to converge with spiritually oriented, transpersonal wellness movements (Murphy, 1992; McGuire, 1988).

Societies and their respective cultures vary in their ability to provide institutionalized means for preserving and enhancing the self-images and cultural identities of their members. Several theorists have pointed to the inherent interdependence of humans in finding an effective, socially adaptive fit between social structure and environmental demands. For example, Mechanic (1974) assessed the literature on personal coping abilities. He concluded that adaptation is widely perceived as being dependent on the ability of individuals to develop personal mastery over their environment. In Mechanic's view, this position was contradicted by the evidence for the interdependence of people in finding group solutions to socioenvironmental problems.

This perspective has been more recently elaborated by Antonovsky (1987, 1979) in positing the concept of "salutogenesis." (It is perhaps an

indication of the dominating conceptual framework of pathoger new terms have to be coined to describe a presumably qua different health status on the positive end of the spectru tonovsky's salutogenic orientation grew out of his own backg traditional public health, but it came to be focused on the origi sustaining conditions for health rather than the etiology of ill proposed the concept of "generalized resistance resources" as of health and included among such resources any phenomenon effective in combating a wide variety of stressors. Althou resources are easy to identify in the abstract (e.g., social s money, and ego strength), Antonovsky sought to specify the elements of the dynamic process by which such resources p healthy functioning. He posited a "sense of coherence" as the ing concept, defined as

> a global orientation that expresses the extent to which one has a p enduring, though dynamic, feeling of confidence that one's inte external environments are predictable and that there is a high proba things will work out as well as can reasonably be expected. (Antonov p. xiii)

Antonovsky's subsequent work has extended the model to the empirical support for and the heuristic value of adop salutogenic perspective (Antonovsky, 1987). It is consistent wit of communal coping (David, 1979) that come from quite theoretical and empirical origins. Likewise, there are clear pa the moral or behavioral codes that serve as the central th organizing life in other segments of our society. Consider, for the concept of *sa' a naghai bik'e hozhq*, or simply *hozhq*, in th world view:

> Kluckhohn (1968) identified *hozhq* as the central idea in Navajo thinking. But it is not something that occurs only in ritual song and p referred to frequently in everyday speech. A Navajo uses this concept his happiness, his health, the beauty of his land, and the harmo relations with others. It is used in reminding people to be careful and and when he says good-bye to someone leaving, he will say *hozhqqgo* "may you walk or go about according to *hozhq*." (Witherspoon, 1977

*Sa' a naghai bik'e hozhq* encompasses the notions of conne reciprocity, balance, and completeness that underlie contex ented views of human health and well-being (Stokols, 1987 1984; Moos, 1979; Sandner, 1979). As a subsequent sectio chapter suggests, many contemporary mental health promoti ties in the United States can be construed as expressions of att

that informs the particular approach.

## HEALTH PROMOTION PROGRAMS

The concepts described above have guided the development of the content, process, and outcome criteria of the various mental health promotion programs. The committee has chosen from among these programs some examples that illustrate the range and diversity of these activities on the contemporary scene, but has made no attempt to evaluate these programs according to any more stringent criteria.

The best current, single source of mental health promotion literature is contained in the annotated bibliography prepared by Trickett, Dahiyat, and Selby (in press). However, the mental health promotion literature constitutes a minute portion of the entire bibliography, only 22 of 1,326 references, and Trickett's definition of mental health promotion was not especially clear. He focused on articles "dealing with mental health education as a preventive strategy . . . and preventive interventions intended to promote varied aspects of mental and physical health" (Trickett et al., in press). About half of the 22 articles focused on preventing illnesses. This is itself a statement about the relative attention that has been given to mental health promotion.

The mental health promotion examples cited by Trickett range from those that focus on the acquisition of health-enhancing habits (Albino, 1984) to specific intervention programs in child and maternal health (Groves, Leeson, and Slovine, 1989; Peters, 1988; Bronstein, 1984; Chamberlain, 1984). These include efforts across the developmental life span (Re, Noble, and Howard, 1990) targeting issues specific not only to youth but also to older adults (Leventhal, Prohaska, and Hirschman, 1985; Gioiella, 1983). A large portion of the literature reviewed by Trickett and his colleagues reveals that, regardless of focus, social resources are a critical element in most promotive endeavors (Kulbok, 1985), especially insofar as natural support groups can form the basis for promoting desirable behaviors and empowering individuals (Albino and Tedesco, 1987; Mechanic, 1985).

Supporting and strengthening family functioning is, of course, a focal issue in many mental health promotion efforts (Duffy, 1988; Bowman, 1983), which reinforces earlier views of the critical role of the family in providing the foundation for healthy child, adolescent, and adult functioning (David, 1979). However, echoing Bradburn's earlier empirical research on the structure of individual well-being, Dunst, Trivette, and Thompson (1991) found that the prevention of poor outcomes could

not be equated with the strengthening of family functioning, a the absence of individual problems did not necessarily indi presence of positive family functioning.

The work of Spivack and Shure (1974; Shure and Spivack, 1 interpersonal, cognitive problem-solving deserves to be include mental health promotion efforts, especially since it has gained r broad acceptance in school-based efforts to promote self-este prosocial behavior (Groves et al., 1989). This program, "I Can Solve: An Interpersonal Cognitive Problem-Solving Program, cluded as an illustrative preventive intervention research pro Chapter 7 and is an example of how the same program may se preventive and promotive functions. The recent studies of youth (Wyman, Cowen, Work, and Parker, 1991; Parker, Cowe and Wyman, 1990; Work, Cowen, Parker, and Wyman, 1990; and Work, 1988) also serve as examples of mental health promo do the various studies of resilience and invulnerability (Beardsl Garmezy, 1985; Werner and Smith, 1982).

Still other examples of mental health promotion present complex array of human activities from which to draw and a c ably greater challenge in terms of categorization. Because these typically oriented to scientific validation, it can be difficult to trac line from their theoretical underpinnings to the methods used outcome criteria by which results might be judged. Just as K (1984) described the heterogeneity of indigenous systems of he too can the myriad of human activities that may be motivated b health promotion efforts be seen as local forms of expression i range of contexts.

One of the best places to look for examples of such menta promotion efforts is among the diverse settings that provide some nonprofessional "healing," a term that is becoming widely embra metaphor for less stigmatized, more participatory, holistic, and p oriented approaches to addressing the (dis-)order of the human co It commonly is assumed that such practices are sought by those ately grasping for a solution to a terminal illness after having e the resources of professional biomedicine or by those lacking the tion or discipline to comply with a medically prescribed regime however, is a misconception (Eisenberg, Kessler, Foster, Norlock, and Delbanco, 1993). McGuire found that although a few adher participated in ritual healing practices as a last resort, most were by a larger system of beliefs of which health-illness concerns we part. "For most adherents, therefore, the use of alternative typically involves a totally different definition of medical re

alternative etiology of illness, and a specific theory of health, deviance, and healing power" (McGuire, 1988, p. 5).

Equally important, McGuire's research did not support the rather common misconception that alternative healing practices and the systems of belief that informed such practices were characteristic of rural, poorly educated, lower-class persons, or that such practices had waned with increasing social mobility. Rather, her study demonstrated that alternative healing had considerable appeal to well-educated, economically secure, middle- and upper-middle-class residents of suburban communities.

A similar conclusion probably can be drawn with respect to the consumers of contemporary mental health promotion activities. Indeed, the "meaning-making" functions—that is, the communication of a structure for perceiving and assigning significance to people, places, and events—of participation in these practices may have many mental-health-promoting effects. This is perhaps what Antonovsky (1987, 1979) had in mind when he referred to the ability to maintain high levels of health by translating difficult, complex bombardment by environmental stimuli into a meaningful whole that provides a sense of coherence. Such concepts clearly go beyond those contained in the models of competence, positive mental health, and self-efficacy reviewed above.

Mental health promotion activities are common throughout many cultures. Among Native Americans, for example, the sweat lodge ritual can be and often is used by relatively well-functioning persons. The cultural practice in this case involves the sweat lodge purification ritual (*Inipi Onikare*), which is regarded as a "serious and sacred occasion in which spiritual insights, personal growth, and physical and emotional healing may take place. The purpose of purification is experienced on numerous levels of awareness, including the physical, psychological, social, and spiritual" (Wilson, 1988, p. 44). Many symbolic aspects of the physical construction of the sweat lodge and the various objects are part of the ritual (Brown, 1971). Of more direct relevance here are the psychological effects attributed to the ritual process, which includes a physically close circular arrangement of participants to increase unity and bonding, individual prayers involving self-disclosure of personal concerns and needs, as well as the needs and concerns of others, and the "opening" of the Four Doors through a cycle of prayers (actual opening of the sweat lodge door with change in heat and light conditions), which is controlled by the medicine person, who works to lead the group to

> see more fully the symbolic nature of the ritual as a paradigm of life's central struggles. The juxtaposition of darkness and light may then take on deeper symbolic values as the paradigms of life versus death; insight versus ignorance;

growth versus stagnation; hope versus despair; relief versus suffering; versus stasis; connection versus separation; communality versus aloner will versus resignation. (Wilson, 1988, p. 54)

Wilson provides an explanation of the psychobiological as altered states of consciousness that have commonly been obser measured during the ritual and of the shifts in hemispheric dor of the brain that are part of the altered states of consciousness cor produced by ritual participation. Other aspects of the ritual are d to promote a sense of the continuity of the community a continuity of the individual in the culture. The conclusion of the typically accompanied by a number of positive psychological ou including a sense of emotional release and a feeling of renewal ar strength. Clearly, for many people, participation in the chu related religious activities serves similar purposes and offers com benefits. These benefits have been particularly well-documer African-Americans (Neighbors, 1990; Dressler, 1987, 1985; Mayp Anderson, 1987; Neighbors, Jackson, Bowman, and Gurin, 198

Another example of a contemporary form of mental health pr can be found in groups combining Eastern meditation practices Zen, transcendental meditation, and yoga, and tenets of the potential movement that have gained increasing popularity i parts of the country. According to McGuire (1988), Eastern me practices in the United States trace their historical roots to the la of the nineteenth century but did not receive much public rec until they were popularized through press coverage beginnin 1960s and 1970s. Their increasing popularity was brought abou by the growth of the self-realization goals of the human p movement, whose adherents subsequently turned to Eastern spi for their longer-term development. McGuire noted as well tha Eastern spiritual forms have attracted not only the stereotypic tercultural youth but also middle-aged, established, and e persons. Because the membership of Eastern meditation groups human potential movement appears to overlap considerably, M treats them as one in her systematic examination of their core el

Ideal concepts of health and wellness are a prominent element groups, which emphasize balance among physical, psychologi spiritual levels of the individual, as well as energy, flexibili self-awareness (Goleman and Epstein, 1983). They emphasize a view of these elements in interaction and use such concepts literal and metaphorical ways to refer to both physical and well-being. Thus they emphasize a life-style characterized by ba

all spheres of life, seeking moderation and avoiding excess as a means of achieving a state of optimal balance. Life-style choices are a prominent feature of the means by which the desired state of well-being can be attained. These choices extend to larger social, environmental, political, and economic issues in an attempt to address real causes and not just the symptoms of imbalanced states.

The source of health, as well as of overall well-being, is conceived of as a universal life force that is more spiritual than mechanistic. This force provides the basic energy required for states of physical and spiritual well-being, and many of the practices of the groups are oriented to adjusting such energies into a harmonious flow. Eclecticism characterizes the choice of healing and health practices in both individual and group form. Meditation, massage, yoga, and dance therapy might be among the simultaneous or serial choices of health-oriented practices to bring about purification or promote balance and personal growth.

The element of flexibility as a criterion of well-being is fundamental for judging the beneficial outcomes of the belief system and life-style choices of adherents to Eastern meditation and the human potential movement. Practice, technique, beliefs, and methods of managing one's life are not given eternal validity but are rather viewed as appropriate for a particular time, place, and problem that at some point no longer applies. Thus the impermanence of both physical and psychological substance are considered the natural state, and self-awareness and self-responsibility are key requirements of general well-being. A generalized faith in the expectation that usefulness of whatever practice one is employing also characterizes this approach. Hence, being part of the "flow" without fully understanding or being able to control it is considered an important corollary of the generalized expectation of beneficial outcomes.

There are striking parallels between the beliefs and practices of Eastern meditation and human potential adherents derived from non-Western cultures and those articulated in the more formalized conceptual framework of generalized resistance resources and sense of coherence proposed by Antonovsky (1987, 1979). In Csikszentmihalyi's (1990) examination of the psychology of optimal experience, he depicted both as related to "flow" as the organizing concept.

The reemergence of such concepts, which appear to have long histories and broad cross-cultural recognition, leads to the issue of the rediscovery of fundamental aspects of psychological well-being that can inform mental health promotion. A common misconception is that such belief systems espouse some unattainable utopian ideal of mental health that has little relation to everyday existence. To the contrary, such belief

systems are oriented to understanding how human beings find positive meaning and identity-sustaining experiences about coping with life's adversities (da Silva, 1990). Over 20 Bradburn (1969) empirically demonstrated in studies with h a subjective sense of psychological well-being consisted of a positive and negative emotions, not just positive ones.

Most of the intervention strategies discussed to this poin individually rather than collectively oriented in design and tation. There is, in addition, an emerging emphasis on link ual-focused, small-group/organizational, and community to mental health promotion (Fawcett, Paine, Francisco, and Hawkins and Catalano, 1992; Weiss, 1991; Braithwaite an 1989; Winett, King, and Altman, 1989; Green and Rael McLeroy, Bibeau, Steckler, and Glanz, 1988; Green, 1986). Th tive assumes that the healthfulness of a situation and the w its participants are influenced by the diverse interplay among psychological, and social factors. It also assumes that the effe any health promotion activity can be enhanced through the c of individual and group action at different levels: family me attempt to improve their health practices, corporate mar shape organizational health policies, and public health of supervise community health services (Green and Kreuter, 1 et al., 1989; Pelletier, 1984). This particular perspective has promotive policies and community interventions at municipa national, and even international levels.

For instance, *Toward a State of Esteem* (California Dep Education, 1990), a legislatively mandated review, outlines hensive plan for engineering massive increases in self-e personal as well as social responsibility. Such change is advoc private and public sectors, targeted simultaneously at i families, schools, neighborhoods, business, and government wide variety of means. Examples include nurturing and programs for teenage parents (Family Development Reso Adolescent Family Life Programs), as well as specialized foster care and institutional staff to promote personal and so sibility among their wards (Sacramento County Foster Pare Program). Other examples are in-service and credentialing re for educators that emphasize self-esteem enhancement sk Education, Annual California Self-Esteem Conference), rea curricula (College Readiness Program, Partnership Academy and parent-school collaboration in education (Project Self-Es Parents as Teachers Project). Still other examples include

partnerships in after-school projects that promote constructive, prosocial experiences and serve as alternatives to activities that may place youth at risk of delinquency and violence (Urban Youth Lock-In, Stop-Gap Theatre); peer-support groups that foster learning, self-confidence, and motivation among welfare recipients (GAIN, GOALS Program); and strategies that positively reinforce employee responsibility in the work place (New Ways to Work). A basic theme is simultaneous, coordinated action across these different domains.

Recent examples of intercity and cross-national cooperation in mental health promotion include the World Health Organization's (WHO) Healthy Cities Project (World Health Organization, 1988, 1986, 1984; Ashton, Grey, Barnard, 1986; Hancock and Duhl, 1985). Recognizing that healthy cities continually create and improve physical and social environments conducive to their residents' well-being, WHO orchestrates, through technical assistance and resource materials, the development and implementation of citywide health plans. Healthy Cities Indiana (Flynn and Rider, 1991) represents the U.S. counterpart, in which Indiana University, the state public health association, six Indiana cities, and the W.K. Kellogg Foundation have combined their efforts to bring about planned change to improve community life. Other communities are rapidly adopting similar plans, such as the Healthy Communities Initiative, a cooperative venture between the National Civic League and the U.S. Public Health Service. Specific examples include the Kansas Initiative, involving the Wesley Foundation and an array of citizen as well as institutional participants (Fawcett et al., 1993), and the Colorado Healthy Communities Initiative, which employs community and agency coalitions, supported by the Colorado Trust. As is evident, these endeavors frequently engender significant investment by private as well as public sponsors. The Municipal Foreign Policy Movement has provided a similar forum for intercity development of legislation in health promotion and environmental protection (Agran, 1989; Shuman, 1986). Regardless of the particular form such enterprises take, all value citizen action in, mutual investment toward, and shared responsibility for promoting health, well-being, and positive life-styles.

## GAPS IN OUR KNOWLEDGE

The current level of knowledge about the mental health promotion activities that are occurring in this country is sparse. Gaps in knowledge include a wide variety of topics that could be addressed in a research agenda.

A useful body of theory exists as one component in the l
base for mental health promotion activities. Several lines
might prove especially fruitful in expanding our understandir
the motivation for psychological well-being, and what are the
under which it emerges? How many dimensions are neces
complete accounting of the variations in psychological well-
the different forms of alternative mental health promotion nc
reflect significant needs that have not been met by other me
interventions? Do promotion efforts arise from attempts to
the social stigma that frequently accompanies the onset of dis
individual? Does the pursuit of wellness, holism, empowerm
sense of coherence reflect the need for buffers against the
involved in the illness experience (Kleinman, 1984)? Perhaps
tion has been so focused on psychopathology that we have
significance of the tremendous grass-roots efforts that are
pended in the pursuit of psychological well-being.

McGuire's (1988) analysis of the new individualism involve
ritual healing suggests that conventional, institutional forms
may be losing their effectiveness in providing means for m
and furthering self-esteem. Did conventional healing eve
sufficient avenues for pursuit of the positive self-symbol, or
avenues limited to the fortunate few? Perhaps mental healt
ners and researchers have failed to understand that lay def
psychological well-being are at variance with professional vie
medical practitioners have long operated with different e
models of physical disease from those of their patients (Kleinn
Perhaps it is time to consider how the psychological, biosocia
and spiritual dimensions intersect in contemporary definitio
chological well-being and mental health promotion.

Cultural variations in mental health promotion activities an
in which specific cultural practices might inform mental hea
tion might prove to be particularly significant areas of ir
alternative forms of mental health promotion serve different
society or subcultures of the mass culture? What determines
choice of mental health promotion resources, and how c
placed in a devalued social role affect such choices (as may
subcultural group members)? Has the multicultural nature of
been a significant factor in the emergence of diverse modes
health promotion?

A closely related issue concerns the extent of simultane
different methods of mental health promotion. Options fro
tional and alternative systems are sometimes presented as po

requiring allegiance to one or the other orientation. But individuals often choose more than one option, as in participation in workplace wellness programs during the week and ritual healing practices on the weekend. Individuals' simultaneous use of different methods may be an expression of their self-determination and may reflect goal-oriented striving to incorporate new sources of information to promote self-esteem.

The types, forms, scope, frequency, and location of mental health promotion activities are poorly understood. How many people participate in mental health promotion activities? Of what kind? What are their sociodemographic characteristics, particularly with respect to subcultural variation and geographic location? Where are mental health promotion activities occurring, and where else could they be implemented? Schools and work sites are obviously prime locations, but perhaps there are many other venues the potential of which has been underestimated, such as churches, neighborhoods, and cities. How are these activities organized, and who uses them? Much contemporary mental health promotion activity appears to emanate from religious and spiritual beliefs that historically have not been available for empirical study in the United States. Can such activities now be studied?

A critical issue concerns how to determine the actual outcomes of participation in different potential mental health promotion activities. What criteria are to be used in evaluating the outcomes of these activities? This question goes directly to the issue of the impacts of conventional and alternative forms of mental health promotion. Is one or the other superior in outcomes for specific groups of individuals? Is a combination of involvements more effective for long-term psychological well-being? If alternative methods yield promotive benefits, how do they produce such effects? Do they achieve outcomes different from or similar to those of more conventional methods? Not much is known about the harm some mental health promotion activities might cause. What potential adverse effects are there? Are particular forms of mental health promotion likely to cause harm? Are specific groups of individuals more at risk?

We simply do not understand the full range of the phenomena involved in mental health promotion and certainly lack the evidence to reject alternative sources as useless. Kleinman (1984) suggested that no policies be advanced that might control nonprofessional indigenous healers in the United States until research could demonstrate if such activities were beneficial or counterproductive to the nation's health. An analogous position probably is advisable with respect to the complexities involved in the measurement of the myriad forms of potential mental health promotion activities engaged in by the U.S. public.

Mechanic (1991) has taken a similar position with regard to resea the sources of health and disease, which vary widely in a community. Referring to researching the idea of health in broad he comments: "Definition and measurement is central to the cha but to allow the easily measurable to guide our definitions of w important and our research efforts would be exceedingly foolis 32).

A related issue concerns the criteria by which costs and benef calculated. The social and economic costs and benefits of conver mental health promotion activities figure prominently in any re agenda. Are alternative mental health promotion efforts more s acceptable and cost-effective than those provided through conver means? If workplace wellness programs can demonstrate positiv effectiveness, may there be equal or greater benefits involved for who participate in alternative mental health promotion, or some bination of the two?

People in our society are deeply committed to health pror pursuits, expending enormous resources to attain happiness an nity. Success often has been equivocal, certainly uneven, and the of mental health promotion are to some extent culture-bound. No less, this endeavor—the promotion of mental health and well-b will continue. Hence it behooves us to proceed thoughtfully an care on a research agenda regarding these activities.

## FINDINGS AND LEADS

- Health, wellness, zest, resilience, self-efficacy, empowe order, balance, harmony, integrity, energy, flexibility, a sense of ence: each represents some facet of an underlying human exp that is desirable, satisfying, perhaps even necessary. In the qu understand and ultimately attempt to prevent suffering, it is imp to not lose sight of another, equally powerful imperative, that need to nurture positive regard for one's self and the world arou There appear to be many ways of accomplishing this goal of pro of mental health; clearly, each entails more than seeking freedo disease or ailment.
- Research on mental health promotion, defined as distinc enhancement of protective factors within an illness model, ma difficult concept for some to accept. In part, this may reflect a t between expressing an openness to new ways of thinking about health on the one hand, and attempting to be scientifically rigoro skeptical on the other. An analogous tension in the physical illne

as partially resolved in 1992 when the National Institutes of Health stablished an Office of Unconventional Medical Practices—later re-amed the Office of Alternative Medicine—and began systematically to xplore such interventions. The decision to use federal support to etermine the effectiveness of unconventional medical practices was ntroversial and momentous. It was an acknowledgment of the wide pplication of such practices and an openness to their potential useful-ess.

- Traditional mind-body dichotomies are alternative ways of under-nding the same phenomenon. The concept of health promotion has egun to integrate these perspectives.
- In Chapter 7, a small, but growing body of scientific evidence uld be cited in regard to the efficacy of interventions for decreasing sk factors and enhancing protective factors with an ultimate goal of eventing mental disorders. No comparable corpus of knowledge is ailable with respect to mental health promotion. The current level of nderstanding about the potential contribution of conventional and ternative approaches to the goals of mental health promotion is sparse.
- Current public and private expenditures to promote mental health e substantial. They are perhaps similar to the amounts spent on evention research and service programs reviewed elsewhere in this port. Because we know little about the outcomes from promotion tivities, it would be useful to assess them scientifically. A research enda could begin by cataloging mental health promotion activities ross the life course and crafting outcome criteria that could be used in gorous evaluations down the road.
- Enthusiasm for the health promotion movement should not inter-re with a willingness to evaluate potential harm from such activities. r example, although mental health promotion activities do not use an ness model, persons with severe mental disorders may seek out such tivities, viewing them as alternatives to standard treatment. Ethical sues such as this will be paramount in any attempts to bring method-ogical rigor to the mental health promotion field.

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# AN AGENDA FOR THE NEXT DECADE

# 10

# Designing, Conducting, and Analyzing Programs Within the Preventive Intervention Research Cycle

Successful science benefits from cumulative progress, and the field of prevention of mental disorders is no exception. The previous chapters have detailed the progress to this point, including the verse lessons that can be taken from other areas in health research. It apparent from the review in Chapter 7 that an encouraging number of ell-designed research programs on the reduction of risk factors asso-ated with the onset of mental disorders do exist. The task over the next cade will be to enlarge that body of work into a prevention science by stituting rigorous standards for designing, conducting, and analyzing ture preventive intervention research programs. By adhering to such andards, prevention can achieve the credibility and validity necessary r its interventions to reduce the incidence of mental disorders.

Only rigorous standards can lead to an enrichment or expansion of e knowledge base essential for prevention efforts. Outcomes from als built on such standards can serve to refine hypotheses and cepts related to risk and protective factors. The model building and ypothesis testing inherent in prevention research can elucidate path-ays taken by individuals as they move toward or away from the onset a mental disorder, as well as intervening mechanisms and brain-havior-environment interactions that result in mental disorders or ert their occurrence, even in individuals at very high risk. In addition,

empirical validation of preventive interventions can usefully i
broaden clinical practice. Epidemiological evidence, for exa
suggest causal factors that can best be tested in a preventive in
research trial, which may, in turn, suggest molecular or
mechanisms for further study.

## THE PREVENTIVE INTERVENTION RESEARCH CYC

Just as the development of prevention into a science requir
of rigorously designed research programs for its collective pr
an individual research program requires a series of carefull
and implemented steps for its success. Figure 10.1 presents th
tee's concept of how these steps build upon another in the
intervention research cycle. The process proceeds in much
sequence as it has in the report to this point. The first step is
and define operationally and reliably the mental disorder(s) o
The second step is to consider relevant information from
biological and behavioral sciences and from research on the tr
mental disorders, and to review risk and protective factors
with the onset of the disorder(s) or problem, as well as prio
and mental disorder prevention intervention research. The in
then embarks on designing and testing the preventive interv
conducting rigorous pilot studies and confirmatory and replic
(the third step) and extending the initial positive findings in
field trials (the fourth step). If the trials are successful, the
facilitates the dissemination and adoption of the program int
nity service settings (the fifth step). Most of the research
presented as illustrations in Chapter 7 are at the third step.

Although the review processes that constitute the first a
steps in Figure 10.1 are considered to be part of the
intervention research cycle, the original studies in these areas
exception of the previous studies on the prevention of menta
or problems, are not. For the individual researcher, it is the a
the third and fourth steps that constitute preventive in
research per se. Likewise, it is not the community service pr
its evaluation but the facilitation by the investigator of the
widespread dissemination and adoption (the fifth step) that is
research cycle. The knowledge exchange processes that opera
the researcher and the community at this step are discusse
detail in Chapter 11. (In this report, the term *community* refers
a community as a whole, but also to an element within a co
such as a school, health care clinic, advocacy group, or neigh

ıe final steps in the cycle, represented by the feedback loop, are to view the results of any subsequent epidemiological studies to deter-ıne if the prevention program actually resulted in reductions in cidence of the targeted problem or disorder(s) and to respond to mmunity representatives regarding their research interests and sug- tions for further work.

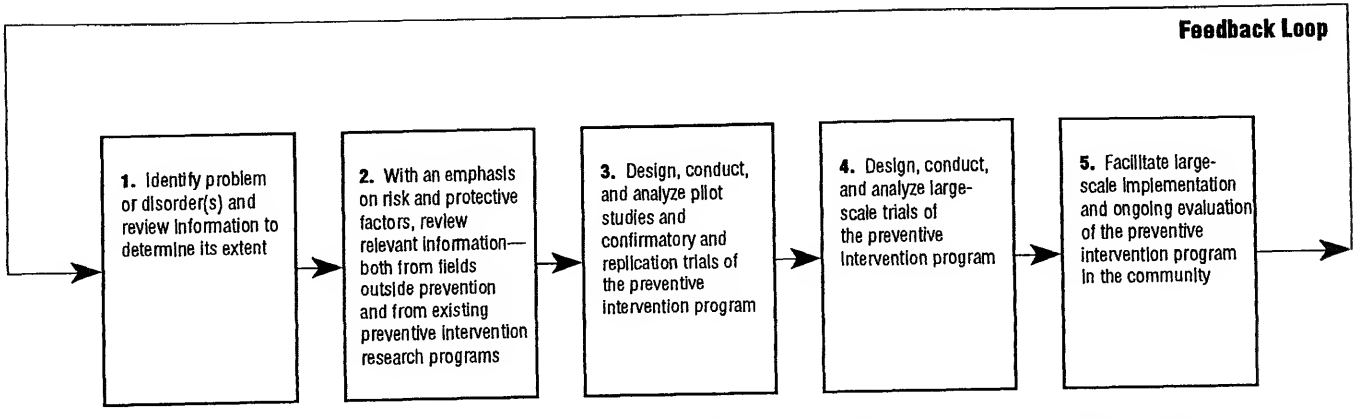
Each step in the cycle is outlined below. Sections later in the chapter esent a host of issues relevant primarily to the research activities in ps three and four—including methodological issues pertaining to perimental design, sampling, measurement, and statistics and analy-, as well as documentation issues. Cultural, ethical, and economic ues that require attention throughout the cycle are also presented.

In this discussion the terms *preventive intervention program* and *preven-e intervention trial* are carefully delineated. The preventive interven-n program is the activity or activities that are provided to the target pulation (e.g., home visitation with mothers and their infants or a bstance use resistance training curriculum delivered to school chil-en by their teacher). The preventive intervention trial is the research mponent designed with experimental protocols to evaluate and vali-te the success of the intervention program. *Preventive intervention earch program* is the inclusive term for the program plus the trials.

## Identification of the Problem or Disorder(s) and Review of Information Concerning Its Extent

The first step in the preventive intervention research cycle is to entify the disorder, cluster of disorders, or problem that is to be the rget of the intervention. Knowledge regarding the diagnostic criteria d course of the disorder, as well as its incidence and prevalence, can helpful in determining whether a preventive intervention for a ticular disorder is warranted. Problems that are appropriate targets intervention can include those such as child maltreatment that are rious social problems in their own right but are also risk factors sociated with the onset of mental disorders. At this step in the search cycle, the investigator also considers the personal, social, and onomic costs associated with the suffering and disability resulting om the problem or disorder.

Further, because prevention research almost always touches the mmunity in some way, even at its earliest stages, a partnership in oject planning between the researcher and the community is highly sirable. Questions to ask at this point include: Is the particular oblem or disorder a matter of concern within the social unit—




- Review diagnostic information
- Review epidemiological data on incidence and prevalence
- Review information on costs to society
- Initiate partnership with the community
- Determine level of community concern

- Review relevant information from physical health, the core biological and behavioral sciences, and epidemiology of mental disorders, including age of onset
- Review research on treatment of mental disorders
- Review research on risk and protective factors for onset of mental disorders
- Review illustrative preventive intervention research programs that meet examination criteria (described in Chapter 7)

- Choose a theoretical model to guide the intervention
- Design the form of the intervention, including activities, change technologies, and sites
- Determine theoretical and technological feasibility
- Recruit and train interveners
- Identify and secure cooperation from participants
- Choose the research methodology, including, for the risk reduction model, short-term and intermediate outcome measures to determine

- Work to enhance cooperation between researchers and community organization personnel
- Adjust form of program as necessary
- Adjust trial design as necessary for scale-up
- Conduct multiple generations of field trials to ensure continued efficacy and to distinguish core elements (needed to ensure fidelity in program adopted by community) from adaptable characteristics
- Conduct final trial to determine effectiveness
- Document thoroughly

- Provide a manual outlining program and delineating core elements and adaptable characteristics
- Facilitate decision about adding an evaluation component

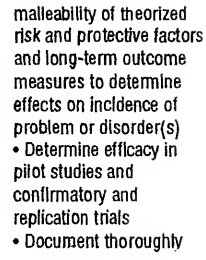



FIGURE 10.1 The preventive intervention research cycle. Preventive intervention research is represented in boxes three and four. Note that although information from many different fields in health research, represented in the first and second boxes, is necessary to the cycle depicted here, it is the review of this information, rather than the original studies, that is considered to be part of the preventive intervention research cycle. Likewise, for the fifth box, it is the facilitation by the investigator of the shift from research project to community service program with ongoing evaluation, rather than the service program itself, that is part of the preventive intervention research cycle. Although only one feedback loop is represented here, the exchange of knowledge among researchers and between researchers and community practitioners occurs throughout the cycle. The feedback loop demonstrates both the continuity of the cycle and the necessity to incorporate many different types of feedback into each step, including community responses, additions to the knowledge base, and ultimate effects of programs on incidence and prevalence of disorders. Cross-cutting issues regarding methodology, documentation, and cultural, ethical, and economic concerns are treated in the text.

community, school, neighborhood, mental health service where the research would be carried out? Would the comm responsive to the development of a research program to add concerns? Giving the community a voice in defining the probl formulating the research program and procedures can be don ways, such as by having a representative from the community a delegate from a service agency, participate with the researc an ongoing basis (Kelly, Dassoff, Levin, Schreckengost, and 1988; Weiss, 1984; Snowden, Muñoz, and Kelley, 1979; se commissioned paper by Fawcett, Paine, Francisco, Richter, a and commentaries by Gallimore and Rothman, available as in Appendix D.)

### Review of Risk and Protective Factors and Relevant Info from the Knowledge Base

Information regarding the concept of risk reduction and hov applied in research programs on the prevention of mental dis be obtained from a review of prevention programs in physi (see Chapter 3). Knowing specifics about the predisposing b social risk factors and environmental and personal protective f converge and interact to determine the onset of any mental d critical for decisions that are made about the nature and targ preventive intervention strategy. To acquire this knowledge, tigator can access a panoply of research disciplines, including biology; behavioral, population, and molecular geneti environment interactions; neuroscience; developmental, exp and social psychology; sociology; behavior analysis; cognitiv developmental psychopathology; and population and deve epidemiology (see Chapters 4 and 5). The investigator next what is known regarding the relevant risk and protecti affecting the onset of the disorder(s) or problem(s) of int Chapter 6). This review provides information that will be use choosing a theoretical model that specifies the mechanism or through which these factors have effects. In addition, the r reveal information on sociodemographic or biological characte may be helpful in targeting a population at risk, as well a modifiable risk or protective factors as potential targets for p intervention. A review of the relevant publications on prior p intervention research programs (see Chapter 7) is another ess to take before designing the research program. Finally, some c important information about protective factors has come fron

the treatment of mental disorders (see Chapter 8). Treatments to engthen the social support network and social competence of an dividual afflicted with a mental disorder, for example, have consis-ntly been shown to improve that person's outcome. This points ward preventive interventions to reinforce these protective factors and ereby diminish the likelihood of stress-induced initial onset of illness.

### Pilot Studies and Confirmatory and Replication Trials

Once the pertinent information has been reviewed, the investigator can gin the process of designing, conducting, and analyzing the research ogram. Initially, a small-scale, rigorously designed pilot study is done in arefully controlled setting, often within a community institution, to test ethods and procedures. A pilot study is exploratory in nature, and many erations in design are made. Then the investigator applies the methods d procedures that appear to be successful to a larger population in a nfirmatory trial to determine the efficacy of the research program, icacy being "the extent to which a specific intervention, procedure, gimen, or service produces a beneficial result under ideal conditions" ast, 1988). If a research program proposes to change risk or protective ctors and does so, but the targeted factors are not causal, then the ogram will lack efficacy, failing to prevent the mental disorder even if it cceeds in altering the risk factor. Thus a well-controlled confirmatory al can provide relevant data to confirm or deny the causal roles of pothesized risk and protective factors. Finally, if the results from the nfirmatory trial are encouraging, the same methods and procedures are plied in a replication trial to ensure continued efficacy. The Prenatal/ rly Infancy Project (Olds, Henderson, Tatelbaum, and Chamberlin, 88, 1986), discussed in Chapter 7, is an example of a research program at is now being replicated in a new location.

At this third step in the cycle, the investigator faces a number of cisions. The first of these is the choice of a theoretical model to guide e preventive intervention program. With this model in place, the form the intervention program itself can be designed. The features of the ogram—including such things as intervention techniques and site—e chosen here, although they may be adjusted somewhat in step four, nen the program is applied in a large-scale field trial. Intervention ogram design issues are distinct from the methodological issues volved in designing the research component of the program, a task at is encountered both in this step and in step four and thus is scussed as a cross-cutting issue later in this chapter. When the design ork is done, the processes of recruiting and training interveners and

identifying and securing the cooperation of appropriate participants can begin. Then the studies or trials are conducted. Thorough documentation of all these choices and the reasons for them is essential to subsequent analysis, both in this step and in step four. This is discussed as a cross-cutting issue below.

### *Choosing a Theoretical Model to Guide the Intervention Program*

To prevent the targeted disorder or problem, the investigator chooses a theoretical model based on the available body of knowledge that addresses one or more of the following factors:

- The presence of risk factors and absence of sufficient protective factors correlated with the disorder that may be both causal and malleable, that is, can be altered through intervention.
- The mechanisms that link the presence of risk factors and the absence of protective factors to the initial onset of symptoms (which may involve gene-environment interactions).
- The triggers that activate these mechanisms (including stressful life events, physical illness, and developmental changes).
- The processes that mediate the triggering event and the onset of symptoms.
- The processes that occur once symptoms have developed. Ideally, these processes can be attenuated through indicated preventive interventions before they cross the threshold criteria for diagnosis of the disorder.

The choice of a theoretical model stems not only from formulations of risk and protective factors, mechanisms, triggers, and processes, but also from analysis of interventions. Whether a particular theoretical approach can guide prevention strategies depends on the data supporting it. Practically, most current evidence is limited to assessment of risk and protective factors, although there is considerable speculation regarding mechanisms and triggers. Therefore, for now, basing preventive interventions on the risk reduction model, that is, on theories involving the reduction of risk factors and/or enhancement of protective factors, is the most productive strategy. This may ultimately lead to studies on incidence of disorders. No matter which theoretical model is used, the ultimate goal of reducing the incidence of mental disorders is the same.

### *Designing the Form of the Intervention Program*

The intervention program is made up of (1) the activity or activities that are provided to the targeted population, such as an educational

curriculum, supportive counseling, and child care, at a planned frequency and for a set amount of time; (2) the psychological, biobehavioral, educational, organizational, or social techniques and procedures—sometimes called *change technologies*—used; and (3) the site in which the intervention takes place.

Theoretical and technological factors are closely intertwined and affect the choice of the intervention activities and change technologies. For example, educational interventions require teaching techniques known to work. Specific teaching techniques may work well with certain groups but not with others. If the instructors are not able to teach the participants the skills that are thought to decrease the probability of the disorder or problem, the theory cannot be tested, nor the intervention implemented. Interventions may thus have to be redesigned for different groups to address how they learn; language, educational level, cultural background, rural versus urban setting, and generational cohort will need to be considered. In addition to learning theory, intervention activities and change technologies may draw heavily on operations research, social psychology, behavioral modification technology, and a variety of other fields. They may include the use of biological-pharmacological, educational, or skills-building programs, environmental change strategies, new social policies, and regulations or laws.

A variety of questions are typically addressed at this stage in the prevention research process, such as: Is this intervention acceptable and feasible for the targeted population? Has consideration been given to ethical concerns, cultural factors, and linguistic differences? Have issues of access been addressed, including potential barriers in the host institution or community and dissemination of information regarding the availability of the intervention? In addition, questions about intervention intensity (that is, the frequency and length of interveners-participant contacts), the feasibility of administering the intervention to a group instead of individuals, and the use of special technologies such as video tapes, computer-aided learning, and specialized medical techniques are addressed at this stage.

Preventive interventions, in general, should be short enough to be practical, yet intensive and long-lasting enough to be effective. Obviously, it is best if they are not too costly, but the more relevant issue is whether the potential benefits justify the cost. With the possible exception of certain structural interventions, such as helping a participant secure a job, brief interventions usually cannot be expected to have long-term effects in preventing major disorders. Attempts to change behavior or instill certain skills and to sustain these changes over time require intensity of effort, not only from investigators, but also from participants.

Finally, it is useful to obtain information regarding how well the program and its component parts have been received. Feedback to the prevention researcher in this stage can come from the participants in the studies and trials as well as from community leaders (Krueger, 1988; Manoff, 1985).

### *Recruiting and Training Interveners*

The choice of the interveners can be crucial to the success of the preventive intervention program. Sometimes the interveners are professionals; often they are not. Frequently, they have a natural relationship with the participant—such as being a teacher, parent, doctor, or neighbor (see Chapter 7). Careful selection, provision of initial training and ongoing supervision, payment of a salary, a reasonable workload, and involvement, as appropriate, with the interdisciplinary research team, help ensure high quality and low attrition of interveners.

### *Identifying and Securing Cooperation from Appropriate Participants*

The researcher next decides for whom the intervention is appropriate. In general, the less expensive and the less likely to have any unintended adverse side effects the intervention is, the more widely it can be implemented (universal). As the intervention becomes more expensive, and as it becomes more potent, it becomes increasingly important for ethical as well as economic reasons to focus its implementation to reach the population most at risk (selective, then indicated). (See Chapter 2 for a discussion of population groups.) However, this is not to say that universal interventions are inexpensive to deliver. An intervention with even a low cost per participant becomes a large expense when delivered to thousands of participants. However, these delivery costs may be more than offset by the savings realized when disorders are prevented, especially if an entire lifetime of disability and expensive treatment can be avoided.

One crucial element in identifying appropriate participants is the current understanding of the nature of the problem or disorder (reviewed in steps one and two of the research cycle), in part because individuals who already have the disorder in question must be excluded from the preventive intervention and individuals who are at especially high risk should be included. For most mental disorders, genetic predispositions have only a probabilistic influence on the manifestation of the illness. The onset of a disorder often depends on the nature of the interaction between genetic predisposition and

vironment. Therefore, if genes related to mental disorders are entually identified, individuals with these genes may be particularly propriate participants in prevention trials for indicated interven-ons.

Another crucial element is information about who in the population is risk for the disorder or problem. This information comes not only om risk studies but also from treatment research (reviewed in step vo). For example, a high incidence of a particular disorder within a opulation group identified by age, gender, or culture provides clues out whom to target. Finally, a knowledge of the developmental eriods of risk and the ages of onset (from epidemiological studies viewed in step two) is also valuable for decisions regarding when to ervene.

The investigator next develops a plan to successfully engage the rgeted participants. These participants, by definition, do not have a oblem that they are necessarily motivated to cure or relieve. There is o way of ascertaining whether any one individual in an at-risk group ill develop the disorder if the intervention is not received. Therefore otential participants may not be willing to participate. Influential embers of the community can often help by providing access to the rgeted group and gaining their cooperation. The investigator can then orm the potential participants not only about any risks involved, but so about how the intervention may be useful to them. Incentives for rticipation, such as payment for interviews, video tapes of children, inted educational materials, and free transportation, are often pre-nted at this time.

Noncompliance and attrition are major issues in prevention research ograms. The intervention potentially can have its largest effects on rticipants who are receptive to its aims, participate in all intervention ssions, follow through on requests, and continue with the program ntil it is completed. But participants who do not comply may be those the highest risk. Efforts to promote compliance are essential to ell-designed interventions. One way to sustain participation is to ape the intervention so it is sensitive to the local culture and customs the targeted group. For example, it is useful to uncover the targeted opulation's daily routine—including their daily tasks, their values and oals, and their culturally prescribed rules, norms, and scripts—as well the motives, feelings, and meanings they may associate with the tervention (Gallimore, Goldenberg, and Weisner, in press; O'Donnell nd Tharp, 1990). Making participation easy by crafting interventions ongruent with these elements, and relevant to people's lives, will crease participation.

## Large-Scale Field Trials

Large-scale field trials offer an opportunity to expand preventive intervention programs found to be efficacious in initial confirmatory and replication trials to large-scale field conditions. Here also, the benefits and costs of the intervention can be more realistically assessed. These trials help to assess the generality of the efficacy of the program with different personnel, participants, settings, cultures, and conditions. A large amount of research in the field of social innovation and organizational change has addressed these questions. Such trials may require involvement with community service agencies or organizations of various kinds, including social service agencies, mental health clinics, primary health care clinics, schools, and day care centers—all here referred to for convenience as organizations—and will definitely require the involvement of many more interveners. Therefore the investigator, although still theoretically in charge, can lose some control over the fidelity of the implementation unless considerable attention is paid to the details regarding the delivery of the intervention and the recording of data.

Experience tells us that research in naturalistic settings can be beset with complications and failure (Hiltz, 1974). The changes in personnel at this point are often the crucial element. Poor communication and operational tensions between researchers and the organization's personnel are common (Hood, 1990). These problems can lead to certain unwelcome results: personnel may fail to follow through in filling out forms or keeping records, may slow down the work, may provide false or misleading information, may circumvent established procedures, and may even sabotage or move to terminate the project (Hiltz, 1974). Furthermore, researchers are not ordinarily trained to deal with the interorganizational and interpersonal complexities of large-scale field trials.

Projects involving collaborative work between researchers in universities and institutes, on the one hand, and organizational personnel, on the other, can be brought into focus through the lens of interorganizational theory. Hasenfeld and Furman (in press) have specifically suggested the use of the following principles to facilitate these research relationships:

- the problem and purpose should be manifest for both parties from the start,
- the benefits for each party and the reasons for participating should be clear, and
- the expectations and costs should be explicit.

addition, a more satisfactory exchange may occur at this step if a mmunity representative was involved earlier. Such a process helps to otect the community interests and engenders commitment for partic- ation in the field trials. Rossi (1977) pointed out, in addition, that sults of projects are unpredictable and often equivocal and can result disappointment or bitterness within the community organization. rganizational personnel typically are skeptical at the beginning, but ce work is in progress they may develop high and unrealistic pectations about results, especially when their investment of time and fort is substantial. Taking time initially to jointly establish feasible jectives for both entities can minimize this kind of dissonance.

The researcher can enhance the prospects for a cooperative relation- ip by selecting a compatible organization whose concerns and activi- es are conducive to those involved in empirical study (Alkin, 1985). od matches can be found in organizations that

- are open to innovation,
- have been involved in research before,
- train students,
- use information and research regularly in decision making,
- encourage staff to take courses (providing released time or tuition pport), and
- include a number of staff who teach or have taught courses.

rsonnel are then given information on research objectives and meth- ls. Training sessions can include orientation meetings, workshops, ecial seminars, and informal discussions.

Interorganizational collaboration is also a consideration in the selec- n of the investigator's own staff. Shadish, Cook, and Leviton (1991) ve proposed a set of attributes to look for in recruiting such individ- ls, including the ability to function in complex, uncertain and ambig- us situations, a programmatic leaning, negotiation and communica- n skills, flexibility, and the ability to respond rapidly to requests.

Additional guidelines to aid in the shaping of productive interorgani- tional exchange can be derived from the experiences of a team of tervention researchers with extensive experience (Schilling, Schinke, rkham, Meltzer, and Norelius, 1988). They advise that researchers

- approach and orient the organization at least six months in advance,
- invite suggestions from the organization on research objectives d procedures,
- gear operations, if possible, to tangibly benefit the organization's ogram,

- make procedures compatible with organizational processes,
- specify costs to the organization openly and clearly,
- indicate personnel time demands, client risk, and potential liability,
- provide ongoing recognition to personnel for effort and accomplishments,
- provide ongoing feedback through progress reports, and
- help implement intervention products in the organizational setting.

Even for the most carefully designed preventive intervention, a single randomized field trial is not likely to result in an innovation prototype ready for large-scale implementation in the community. Furthermore, critical research questions concerning such issues as the plausibility of causal hypotheses regarding the role of risk or protective factors and the assessment of subsequent rates of disorder may require multiple generations of preventive trials. Both multiple generations and multiple sites may be required to determine the "active ingredients" in the intervention, that is, to distinguish the core elements, which must be included to ensure fidelity when a program is adopted by a community, from the less essential features, or adaptable characteristics (see Chapter 11 for further discussion of this critical issue).

After efficacy has been established in large-scale field trials, a final trial is needed to determine the program's effectiveness (as distinct from its efficacy), that is, "the extent to which a specific intervention, procedure, regimen, or service, *when deployed in the field,* [emphasis added] does what it is intended to do for a defined population" (Last, 1988). For this trial the investigator turns the carefully tuned intervention program over to the organization that hopes to run it, but leaves the research component in place. This stage in the research cycle is frequently not achieved, but the Centers for Disease Control and Prevention is currently planning to test the Infant Health and Development Program (see Chapter 7 and program abstract, available as indicated in Appendix D) for effectiveness in field trials. Convincing documentation of the program's effectiveness (its efficacy already having been established) would be likely to lead to widespread dissemination of the program.

### Facilitation of Large-Scale Implementation of the Preventive Intervention Program in the Community

When researchers and community organizations work together at all stages of the program, they can avoid the problem of "manifest" but not "true" adoption of an innovative preventive intervention. Rappaport, Seidman, and Davidson (1979) have shown what can happen when a

ommunity "adopts" an intervention program shown by research to be fficacious and effective, but modified by community organizations in a nanner that produces unexpected negative consequences for the recipi- nts. This need not happen, but ensuring a positive large-scale implemen- ation effort requires considerable knowledge and attentiveness to the oncepts of core elements and adaptable characteristics. At this step, the nvestigator can provide a manual describing the program to guide mplementation. The investigator can also facilitate a decision by the rganization to include an ongoing evaluation component in the program. See Chapter 11 for a description of other ways to facilitate the exchange of nowledge between investigator and community organization.)

## METHODOLOGICAL ISSUES

It is essential to delineate explicitly the goals at the outset of designing he research component of a preventive intervention research program. or example, is the goal to reduce an occupational, social, educational, amily, or personal risk factor—such as child abuse, marital stress, nemployment, or aggressive behavior? Is it also to enhance protective actors? Is the goal to intervene with mechanisms, triggers, and pro- esses related to the onset of disorder? In addition to these goals, the ltimate goal of preventing or delaying the development of a full-blown nental disorder(s) should be explicitly stated even though at this stage hat may not be the goal of the preventive intervention itself.

The goals influence the types of research methodology that will be sed, as well as the answers to methodological questions encountered in teps three and four of the preventive intervention research cycle. Questions concerning the structure and duration of the trial and ollow-up period, sampling, measurement, and statistics and analysis re considered here, including: What are the characteristics of the opulation to be used in sampling? How large should the sample be? What are the methods to be used to produce and measure changes in the argeted risk and protective factors in the population? What are the nethods to be used to measure changes over time in the incidence of the argeted disorder(s) or problem?

### Structure and Duration of the Trial and Follow-up Period

#### *Structure of the Trial*

The randomized controlled trial, in which members of a population re randomly allocated into experimental and control groups, usually is

the preferred experimental design in research studies, and the most rigorous means for hypothesis testing available in intervention trials as well. Random assignment helps to ens participants' responses are unbiased estimates of what responses would have been if all members of the populatior been assigned to one of the two groups. Frequently, wh designed, there are conceptual or hypothesis-driven reason more than one intervention for evaluation. Hence a partic tion trial may have more than one experimental group, a random assignment is made to multiple groups.

Randomized control groups are particularly important in s indicated prevention trials, especially if the targeted group chosen carefully enough to ensure that they are at very h such trials the interventions are working against the associated with the "natural" course of the pathological pr course is increasingly negative, the results of the inter appear to be an increase in problems that did not exist intervention. On the other hand, some problems are self-li positive results may be due to the passage of time rath intervention. A finding of lower incidence of disorder in the tal group as compared to higher incidence in the control best way of documenting the effect of a preventive interve

Although randomized controlled trials remain the optima preventive intervention trials, quasi-experimental time se can sometimes permit investigators to capitalize on policy c changes and conduct natural experiments in the real wc example, with the Intervention Campaign Against Bully-V lems (Olweus, 1991) reviewed in Chapter 7. Campbell described a number of policy-oriented interventions that lyzed by using interrupted time series and regression, d analyses.

The logic of the interrupted time series analysis is relativ forward. The independent variable, in this case the preventi tion, is expected to produce a change in the group under The intervention "interrupts" a series of baseline obser specified point. If the intervention does indeed have an effe series preceding it should differ from the time series subseq a treatment study, for example, Liberman and Eckman (19 interrupted time series design to assess the impact of two br interventions on suicide ideation and attempts. Both treatr edly reduced suicide attempts when two years following were compared with two years prior to hospitalization.

quasi-experimental time series designs cannot rule out alternative explanations for a change in the variable of interest. Thus it is more desirable to use controlled, experimental forms of time series, such as multiple baseline, multiple schedule, reversal, withdrawal, and multielement designs (Barlow and Hersen, 1973) or to combine time series with nonequivalent control group designs, as Cook and Campbell (1979) suggest.

Obviously, one cannot have as much confidence in the results of quasi-experimental designs as true experiments. Therefore quasi-experimental designs should be used only when it is not possible to randomize. An important problem with nonequivalent control group designs is that researchers simply may not be able to create control groups that are similar enough to the experimental group.

Several other problems severely restrict the conclusions that can be drawn equally from both true experiments and quasi-experiments. Consider, for example, instances in which, despite efforts by the research team, participants in a control group know that they are not receiving the desired intervention. The control group, as an "underdog," may be motivated to reduce or reverse the expected effect of the intervention (Cook and Campbell, 1979), the so-called "John Henry effect." On the other hand, members of a control group may be demoralized in knowing that they are not receiving the desired intervention, and there may be a decrement in their performance. Because control groups are often intact groups that may interact with one another, such as students in a particular classroom or residents of a particular block or neighborhood, their proximity increases the likelihood that they will act in concert or develop similar perceptions of the experiment.

### *Duration of the Trial and Follow-up*

The length of the intervention as described above—short enough to be practical and yet long enough to be effective—governs the length of the preventive intervention trial as well. In addition, because a decrease in the incidence of a disorder is the major long-term goal, participants should be followed longitudinally in prospective designs. Therefore follow-up periods can be quite lengthy, but this is a complex issue. The longer the duration of follow-up, the greater the power—that is, the statistical capacity to be able to demonstrate a significant result—may be to detect the efficacy of the program in showing short-term as well as long-term positive effects. This is not, however, necessarily so. If multiple factors are involved in the onset of a disorder, lengthy

follow-up provides more opportunity for uncontrolled facto
ence outcome.

Long time frames also may be necessary in order to get
age of risk of onset. Preventive intervention trials cannot p
particular disorder has been permanently prevented; the
provide evidence that the onset of the disorder has been del
long as the trial proceeds. A participant still free of the target
at the end of the trial's follow-up period may have the o
disorder one day later, unless the trial has followed the
completely through the age at risk. For many mental diso
ever, risk of onset continues through the life span.

The longer the trial and follow-up, however, the greater t
difficulty, and the longer the delay in obtaining answers to t
questions. Consideration of cost, of course, plays a crucial
setting of the follow-up time. Funding sources are understan
tant to fund research programs that will take 10 to 20 years
results. But the current practice of short-term support is especi
in regard to research on prevention of mental disorders.

Lengthy follow-up periods that delay the reporting of r
disadvantages in terms of scientific practice as well. As time
importance attached to certain research questions changes.
ing are the methods of measurement, diagnostic criteria,
issues that must be taken into consideration. Therefore a ba
be found between the gain in power and precision resu
long-term follow-up and the loss in relevance and quality o
substance that may be incurred. This also suggests that data
kept on symptoms and behaviors because the definition of
subject to change.

The practical limitations placed on the duration of a
intervention trial and follow-up in part can be dealt with by
implementation carefully. Selecting participants who are n
their period of highest risk for the onset of the disorder,
critical developmental challenge and maturation, or a peri
responsiveness to protective effects, permits detection of effe
sufficiently large and immediate.

## Sampling

The choice of the sample from the targeted population h
ological repercussions. The major problem in using selectiv
cated preventive interventions is the identification of th
group. Obviously, it is critical that the definition of high ris

one. The sensitivity and specificity of screening tests are used in the determination of risk status. Sensitivity is the proportion of truly diseased persons in the screened populations who are identified as diseased by the screening test. Specificity is the proportion of truly nondiseased persons who are so identified by the screening test. Sensitivity and specificity of identification criteria tend to "see-saw"; that is, the cost of having high specificity is usually low sensitivity. It is possible to develop criteria with high sensitivity, but the result will be a far looser definition of what constitutes high risk.

It is useful to obtain samples that span the full range of gender and culture among individuals at risk. Since passage of the National Institutes of Health Revitalization Act of 1993, such representative samples are legally required. A trial of a preventive intervention that excludes women produces results that do not necessarily generalize to women; one that excludes minorities may yield results that do not necessarily generalize to minorities. The principle is clear: If one excludes any group from a trial, the results of that trial cannot be assumed to generalize to that group. For this reason, in implementing indicated interventions in which there are stringent inclusion and exclusion criteria, the effects of these restrictions on the generalizability of the results of the trial to the population at large must be carefully considered. In locations that include large segments of non-English-speaking individuals, studies must include assessment and interventions in the appropriate language (Muñoz and Ying, 1993; Maccoby and Alexander, 1979).

The use of a universal population presents methodological problems of a different sort. Such a population is typically diverse and may include participants who are not receptive to the program for a variety of reasons. The heterogeneity, combined with the low incidence rates of the disorder likely in such a population, creates a situation in which very large sample sizes are necessary to detect any indication of efficacy or effectiveness. Because the effects may seem quite small, the clinical or policy significance of the prevention program may be underestimated. Uniform implementation of both intervention and measurement protocols in universal interventions across entire communities may be difficult. Such problems reduce statistical power, either by increasing the heterogeneity of response or decreasing the reliability of the response measures.

For a trial using a universal population, the investigator can plan secondary analyses to focus on those subgroups likely to be most at risk and most receptive to the intervention, in order to generate results comparable to those that would be obtained with the selective or

indicated populations. Thus the investigator can have both generalizability of results and the possibility of specific a priori subgroup analyses of special interest. The costs and difficulties of such studies are, however, often substantial.

Another method for analyzing subgroups is stratification, that is, the separation of a sample into several subsamples, sometimes along a continuum, according to specified criteria such as age or level of education. Stratification can be useful when factors measurable at baseline, that is, at the beginning of the intervention, are believed to correlate strongly with onset of the disorder or problem. In such a situation, greater power can be achieved when samples are stratified before randomization (thus creating subsamples) and participants from the subsamples are randomized to the intervention and control groups.

If there are certain subgroups of the population of special interest, naturalistic sampling will likely yield too small a sample size to draw definitive conclusions that can be generalized to each subgroup separately. To answer questions about subgroups adequately, the investigator should ensure that there is adequate power through oversampling of these groups. Alternatively, it is often desirable to design a separate trial for each subgroup with a sample size adequate to answer the questions.

## Measurement

Although the processes of focusing attention on the questions that require answers, selecting the appropriate measures (and thus excluding the rest), deciding when and how often to measure, choosing the best measurement techniques or instruments, and taking steps to ensure the reliability and validity of the selected measures are perhaps the most tedious and difficult parts of a trial, these are also among the most essential procedures in determining its success or failure.

### *What to Measure*

Careful selection of primary outcome measures is essential to the success of a preventive intervention trial. These are usually the measures of changes in the theorized mediating variables, including risk and protective factors, that are assumed to be responsible for the reduction in risk. They may be psychological outcomes such as measures of precursor signs or symptoms, social outcomes such as reduction of poverty, or biological outcomes such as reduction of the incidence of low birthweight. Finally, in the prevention of mental disorders, it is particularly desirable for programs explicitly to include measures of the

incidence of mental disorders. One benefit of including incidence measures is that they may reveal that a risk factor that was found to be malleable was not causal, thus contributing to the knowledge base about etiology.

Evidence of risk reduction is used as the primary outcome measure, that is, the measure used most often to document the results of the trial, in part because it is available first. For example, in the Perry Preschool Program, a selective preventive intervention with preschoolers that was intended to increase their intellectual and social development (see Chapter 7), the long-term results, including measures of such factors as how long the children stayed in school, took many years to be documented. However, short-term measures of behavioral problems, such as lower rates of aggression, lying, and stealing, served as early evidence of the success of the intervention. Documentation of the changes in risk and protective factors for the child could have been extended for a more complete picture of mediating variables. Although disorder incidence measures were not included in the Perry Preschool Program, it is one of the few research programs to have included long-term outcome measures of any sort.

Measures of process are also appropriate. Because prevention programs typically have many components, it can be difficult to determine which one accounts for the success of the intervention. However, it may be possible to examine, on a more exploratory level, the impact of the different components by gathering data that are descriptors of process. Measures of process are selected to reflect certain characteristics of the participants, program, activities, change technologies, and so on, and of the interaction of these, that might help to generate hypotheses as to why and how the program might work. For example, what is it that the intervener actually said and did during home visits, or how do teachers respond to participants' aggressive outbursts at school? This set of measures can include consideration of risks, costs, inconvenience, and dosage effects. Measures that reflect different theoretical models can be chosen to elucidate most salient elements of the intervention.

Measures of compliance are another type of process measure. Participants at the outset of a preventive intervention trial may simply refuse to participate. If they agree to participate, they may not comply, in whole or in part, with the procedures and activities of the prevention program. It is useful to document the extent of compliance of individual participants throughout the trial. If the program does not prove to be efficacious, it is important to gain insights as to why participants did not comply, as a basis for consideration in the design of future prevention efforts.

A primary goal of a trial is efficacy, but process measures may provide information that can be useful in improving the design of a subsequent prevention effort. Furthermore, such data provide documentation of the fidelity of the program, that is, the extent to which the components of the program as designed were actually delivered and received by the participants.

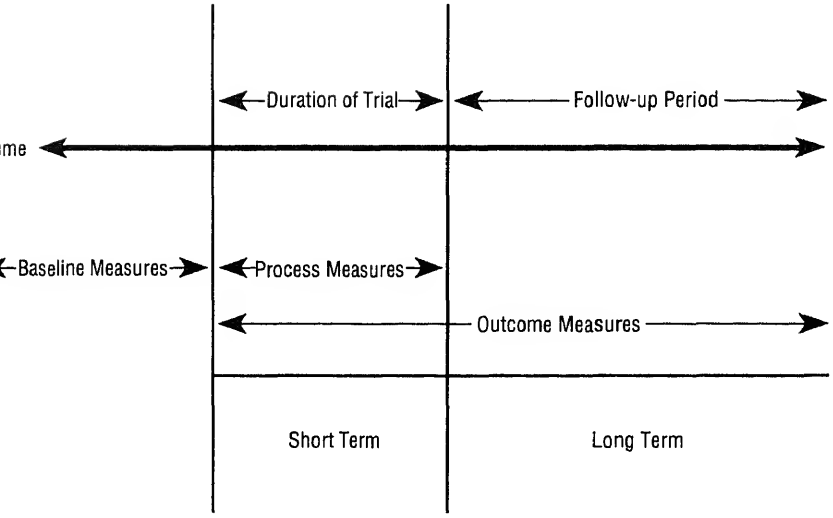
### *When and How Often to Measure*

Random assignment does not yield groups that are identical on all baseline variables. Therefore an extensive collection of baseline information, including targeting variables, is necessary. Without this, the investigator's ability to draw firm conclusions about what would have happened in the experimental group in the absence of the intervention is compromised. The baseline information is also needed to determine eligibility for the program, to ensure that the elements in the prevention program are not already in place in the participants' environment before the experiment, to describe the population to which the results might be expected to generalize, to document the success of the randomization procedures, and, in secondary analysis, to detect those subgroups for which there is differential outcome. If there are dropouts or missing data, baseline information is also necessary to investigate the possibilities of resulting sampling bias. Figure 10.2 shows the points on the time line for the trial and follow-up at which the baseline and other measures are taken.

After the baseline assessment, the greater the frequency of observation, the more precise the measurement of onset and course. Outcome measures on each participant should be taken frequently enough to determine the timing of short-term effects. Long-term outcome measures taken at follow-up to determine incidence should be continued past the mean age of onset for the disorder. Frequent follow-up can bind the participants more closely to the program and promote receptivity and compliance. However, too great a frequency of observation (particularly when the assessments are difficult, long, tiresome, stressful, or invasive) may annoy the participants and produce the opposite effect. The quality of information (validity and reliability) may suffer; dropouts may increase. Clearly, some balance must be achieved.

### *Which Measuring Techniques and Instruments to Use*

The selection of outcome measures for use at baseline, over the short term, and during follow-up includes consideration of the relative value




GURE 10.2 Measurement points along the time line for the intervention trial d follow-up period. The total length of time varies according to disorder rgeted (to get past mean age of onset) and how closely the program is tied to e of highest risk.

d use of continuous (that is, a scaled or dimensional response) easures and the more usual categorical (that is, a number of nonhier-chial responses) measures. Almost always, a variable can be measured th either technique, but the yield is different. When they are appro-ate, continuous measures can increase statistical power, but the ucial issue in deciding on the outcome measures in a trial of a vention program is that of selecting the most valid and reliable easures available.

The most likely strategy to detect effects and to be cost-effective cludes both categorical and continuous measures. For example, the tervention may produce a modest reduction in the incidence of new ses that meet the designated diagnostic criteria for a particular sorder or in the existence of specific risk factors (categorical measures), t may produce a very great reduction or attenuation in the severity d duration of risk factors, including precursor symptoms (continuous easures). Also, even if the intervention failed to prevent the onset of disorder, it might reduce the severity, duration, or disability of the sorder (continuous measures). An example from infectious disease ay illuminate this point. If an antibiotic taken prophylactically to event traveler's diarrhea produced only a modest reduction in the

frequency or incidence of a threshold for diagnosing the enteritis (e.g., presence of bacteria in stool with at least one episode of diarrhea with or without abdominal discomfort), but produced a very large reduction in the severity of the diarrhea (i.e., reduced frequency and amount of loose stools as well as reduced frequency and severity of abdominal discomfort), then the verdict of that prevention trial might be that the antibiotic was indeed useful in prophylaxis. A similar argument could be made for the effectiveness of fluoridated water in preventing the number and severity of caries; the effectiveness of a cognitive behavior therapy preventive intervention on the depth, duration, and disability of major depressions; and the effectiveness of family- and school-based educational and skills training programs with children at risk for conduct disorder on the incidence and severity of subsequent delinquency, substance abuse, and antisocial behavior.

Whether the chosen measures are categorical or continuous, they should display high internal consistency and construct validity based on earlier psychometric analyses and research as well as high reliability with different assessors. With the advent of the DSM-III and DSM-III-R, certain comprehensive diagnostic instruments that can elicit all the signs and symptoms of mental disorders have come into general use and provide a means for improving the reliability and replicability of diagnosis. Diagnostic interviews such as the Diagnostic Interview Schedule (DIS), the Present State Examination, the Schedules for Clinical Assessment in Neuropsychiatry (SCAN), and the Structured Clinical Interview for DSM-III-R (SCID) (all of which can provide continuous and categorical measures) can improve the detection of symptoms. They also lead to operational criteria for improving the accuracy of rating the presence or absence of symptoms or disorders. When diagnosticians are trained in the use of these structured instruments, they become more consistent, systematic, and precise—thereby enhancing the reliability, validity, and power of the preventive intervention trial. In addition, the work groups responsible for producing DSM-IV and ICD-10 have purposely interacted in their development of diagnostic criteria, and these classification systems are coming closer together.

### *How Many Measures and Instruments to Use*

Measures should be carefully chosen and relatively independent. Every variable measured yields both signal and noise. Multiple noisy measures (unreliable measures) of the same signal used separately add no signal to the system, only noise. The signal is merely repeated along with the noise. For this reason, in any set of highly correlated measures,

the investigator should either select the best and delete the rest or combine them into one measure. This strategy not only reduces the number of analyses, thus diminishing the risk of false positive results, but also diminishes the risk of false negative results, because combining multiple measures of the same signal frequently results in "tuning out" much of the noise and thus "tuning in" the signal, resulting in a combined measure that is more reliable.

Having many measurements and diagnostic assessments may compromise the quality control of the measurements. When there are only a few crucial measurements on which the success of a trial depends, the nvestigator can spend a great deal of time and effort to select the best instruments, provide adequate training and orientation to the assessors, and institute adequate quality control procedures. But if hundreds of ariables are collected, expedient measures of limited validity become a emptation, and the consistency and care in assessing each variable may be compromised. The fatigue of both participants and assessors can rther impair the quality of measurements. What is sometimes called a "rich" data set that contains a large number of variables may, on closer nspection, be rich only in noise, not in signal.

Very large data sets require more staff effort to maintain and analyze. A large number of variables will not be helpful if key variables that will eflect the hypotheses are inadequately measured. Investment in quality control of key variables that includes error checking, detection, and orrection procedures is critical to achieve a valid result.

### *How to Ensure Reliability and Validity of Measures*

*Reliability* "refers to the degree to which the results obtained by a measurement procedure can be replicated," and *validity* "is an expression of the degree to which a measurement measures what it purports to measure" (Last, 1988). Seldom do diagnostic procedures in any area of edicine have a reliability coefficient above 80 percent. Many diagnostic procedures in common use have reliability coefficients between 40 and 60 percent. The issue of reliability of diagnosis in psychiatry has ertainly received far more attention than has reliability of diagnosis in most other fields of medicine. But the principle remains: unreliability ends to attenuate power, necessitating larger sample sizes (Kraemer, 979); therefore, it is especially important to develop reliable methods.

A common error made in addressing the issue of validity is to collect any poor measurements in the hope that these will somehow make up or the absence of one highly valid measure. But multiple poor measurements that do not accurately assess the construct of interest can lead

to false positive or false negative results. To add to the confusion, multiple outcome measures can produce contradictory findings, making it impossible to draw any conclusions at all. In addition, lack of sensitivity to cultural variations in meaning can confound the validity of measurement; for example, among the Navajo the concept of "home" includes the extended family, whereas in the mainstream culture it is restricted to the nuclear family. If a measure includes only nuclear family members, it will miss an essential part of Navajo life and therefore be less valid.

To ensure validity, outcome measures ideally should be assessed "blind" to the group to which the participants have been assigned. Measurement and assessment procedures that include any subjective component may be affected by the assessor's knowledge of group membership. Thus a certain response pattern, when observed in a participant known to be in the experimental group, may be assessed differently from the same response pattern observed in a participant known to be in the control group. This phenomenon introduces measurement bias and compromises the validity of the results. A quality control check on raters' blindness can be done by administering a questionnaire to raters at several times during the prevention trial, asking them to make guesses about the assignment of the participants.

As is the case in many randomized controlled trials, however, it is simply not possible to blind all assessors to the group membership of the participants. When the measure is based on self-report, it is often not possible to blind the participants to their own group membership. This situation places a premium on measures that are objective. It also makes the implementation of training and orientation procedures for assessors, and quality control procedures such as periodic reliability testing of the assessors over the course of the study, more vital to the validity of trials of prevention strategies than might otherwise pertain.

Adherence to the measurement protocols of the research program, for both experimental and control groups, adds to validity and reliability. Requirements for such adherence to protocol are often viewed as a rigidity that runs counter to good clinical care, and maintaining these protocols is difficult over the course of a long-term study. Such requirements are often seen as a challenge to the morale and commitment of the researchers, particularly to those who are also clinicians. Special efforts must be made both to inform all research colleagues of the necessity for such adherence and the consequences of deviations from protocol in terms of the validity and power of the results, and to ensure the enthusiastic participation and commitment of all participants to the goals of the study.

## Statistics and Analysis

### *Strategies for Data Analysis*

Randomized controlled trials in which participants are followed longitudinally inevitably entail collection of a great deal of data, no matter how parsimonious the investigator has been in choosing and pruning the type and frequency of measures and instruments. Many statistical methods for analyzing these data exist. For categorical data, the most familiar of these methods are logistic regression, log-linear modeling, and discriminant analysis.

For continuous measures, methods for the analysis of repeated measures are required. Considerable interest has been generated recently by the use of random effects regression models as alternatives to repeated measures analysis of variance and covariance or MANOVA designs (Gibbons, Hedeker, Elkin, Waternaux, Kraemer, Greenhouse et al., in press; Laird and Ware, 1982). In this methodology a separate curve is fit to each participant's response data, using a few clinically interpretable parameters to define the mathematical model for the curve. Unlike the more familiar repeated measures analysis of variance designs, these methods are relatively tolerant of missing data, irregular follow-up, and dropout. Moreover, because these approaches use scaled response data, they can be more powerful than approaches using binary indicators of disorder applied in the same context.

Latent structural equation modeling is a statistical tool for examining the relationships among multiple variables. This statistical methodology is available to clinical researchers as part of major software statistical packages. It permits simultaneous testing of complex multivariate hypotheses and may have considerable promise as a tool for exploratory data analysis. However, its utility in formal statistical hypothesis testing is less clear, because the validity of the statistical tests depends on the correctness of strong assumptions about multivariate distributions and on the existence of a clear theoretical model (i.e., Fergusson, Harwood, and Lloyd, 1991).

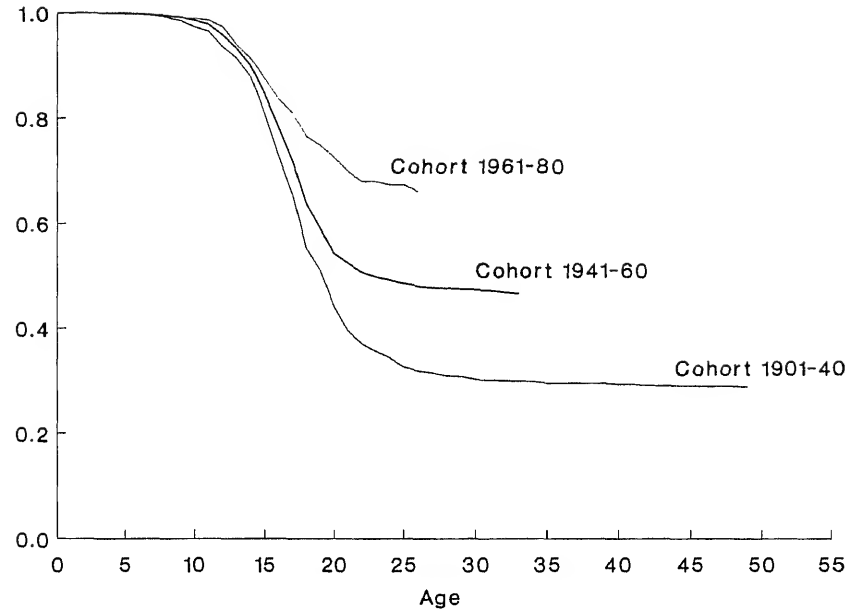
As more data regarding age of onset are gathered, the preferred analytic strategy for comparing incidence rates across groups is likely to be survival analysis. Survival analysis is a flexible and powerful statistical method for analyzing incidence of illness when time to onset is known. Like the more familiar contingency table methods based on counts of numbers of participants who have onset of the disorder during some follow-up interval, survival analysis can be used to compare the risk of becoming ill in two or more groups. Indeed, because survival

analysis depicts incidence across the whole follow-up period, it provides a more detailed picture of outcome. Both parametric and nonparametric approaches are widely available, the former being more powerful when the distributional assumptions are valid, and the latter being less restrictive and more familiar. Survival analysis is typically more powerful than simple counts of incidence during a specified period, particularly when base rates are low. The methodology adjusts for participants who are lost to follow-up. As with regression analysis, covariates can be analyzed, including both main effects and interactions.

The probability of a participant's surviving through a period of risk without developing a disorder may change as the duration of the intervention and follow-up increases. This changing probability is called the survival function. For example, the longer a participant proceeds through the period of risk for a disorder, the lower the probability for developing the disorder. Statistical methods of survival analysis are being used in treatment trials and epidemiological studies of onset and natural history (Elandt-Johnson and Johnson, 1980).

Typically, there are individual differences in the susceptibility among participants in any group—based on risk and protective factors—and these differences are reflected in different survival function shapes. Some participants may be essentially immune to the disorder, and, at the other extreme, some may already be experiencing the precursor signs or symptoms of the disorder at the initiation of the trial. Survival function curves begin at 100 percent and either decrease or plateau as participants succumb to the disorder. Thus it is possible to identify individual differences among participants, as well as to detect differences in effects of the experimental and control conditions.

Groups of participants with high survival curves (i.e., close to the 100 percent level of survival) are "low risk," and those with low survival curves are "high risk," but these are relative terms, with no precise definition. Participants selected from the general population are likely to be "low risk," and participants selected because they have risk factors such as a family history of the disorder are likely to be "high risk" in terms of *lifetime* risk. In the real world, an individual participant's survival curve is a hypothetical construct that cannot actually be seen. However, the *average* survival curve for any group of participants can be estimated and provides information about delay of onset in that group. For example, Figure 10.3 presents three survival curves using new data from the Five Cities Program of Cardiovascular Risk Prevention (see Chapter 3 and the commissioned paper by Kraemer and Kraemer, available as indicated in Appendix D). These survival curves demonstrate the reported onset of smoking in three male birth cohorts: A: (1901




GURE 10.3 Survival function estimates. Using data from the Five Cities ogram of Cardiovascular Risk Prevention, three survival curves demonstrate e stages in the distribution of onset of smoking in three male birth cohorts: A: 901 to 1940); B: (1941 to 1960); and C: (1961 to 1980).

1940); B: (1941 to 1960); and C: (1961 to 1980). The last cohort was born er the publicity and widespread education following the Surgeon eneral's recommendation against smoking for health reasons. The ange in the distribution of onset of smoking is clear. The onset of noking came later, particularly in cohort C, and the lifetime prevalence ndicated by the plateau value) of smoking decreased in the later horts, leaving more nonsmoking "survivors" and a higher plateau lue.

For a given group, the point in time at which its curve reaches the 50 ercent point is the median survival time or median onset time. Thus e median age of onset of smoking for cohort A was about 20 years, and r cohort B, about 22 years. For cohort C, the median time is not less an 25 years (at which point 65 percent have survived without noking), and there may be no median age of onset overall, for fewer an 50 percent may have the onset of smoking during their lifetime.

An interesting aspect of survival analysis is the hazard function, which is the probability of becoming ill at each point in time. Analyses of changes in risk over time may be particularly sensitive indicators of a program's efficacy and effectiveness. The hope is that the intervention program might begin to exert an effect at its inception and gradually build to its full effect as it is fully implemented with desired impacts on the participants' risk and protective factors. The hazard function curve quantifies the probability per unit time that a participant who has survived up to a particular time will have the onset of the disorder in the very short ensuing time interval.

By restricting consideration to those who have survived up to a particular point in time, the investigator can control for factors before that point that have already exerted their effects. By restricting the consideration of the hazard function curve to a short time period, factors that exert their influence on onset of disorder during that time interval only can be identified. Whereas the survival function curve must be either constant or decreasing downward from its initial 100 percent level, the hazard function curve can take any shape at all. It may be flat, it may increase as it does for disorders associated with aging, or it may decrease as it does for disorders primarily associated with infancy. Depending on the natural history and risk periods for the disorder, hazard curves may grow, recede, or have one or several peaks.

Whereas survival and hazard functions can illuminate the changes in incidence of mental disorders among participants in a prevention program, impacts of the program on the severity of the disorders that do develop among participants for whom the prevention program failed, such as the degree of impairment or disability, relapse pattern, or duration of episodes, require the use of prevalence assessments to highlight the differences between the experimental and control groups.

Currently, however, it may not be practical or feasible to obtain valid measures of time to onset for survival analysis. For an insidiously developing disorder, such as schizophrenia, the time to onset may be difficult to ascertain and, at least from the point of view of analyzing a prevention research program, relatively unimportant. If survival methods cannot be used, random effects regression models permit the best use of incomplete follow-up data for participants and help avoid some of the problems of sample bias associated with low retention rates during a trial. However, such problems do not disappear; every missing data point or dropout from the study costs some degree of power.

### *The Unit of Analysis and Statistical Power Consideration*

When interventions are delivered to groups rather than to individuals, the appropriate unit of analysis is the group. Because there are typically far fewer groups than there are individual participants, use of the group as the unit of analysis may appear to result in a major sacrifice in power. However, power is not totally determined by the degrees of freedom, that is, the number of independent comparisons that can be made between the members of a sample. Power is more strongly affected by the size of the effect. Therefore groups can be used as the unit of analysis, and "two-stage" statistical models can be used for that purpose (Gibbons et al., in press).

The number of individuals or groups necessary to detect clinically significant effects with sufficient power is dependent on the design of the trial. The number may vary from two cities per group to tens of thousands of individuals, so choices made in sampling (such as whether entire communities or individuals are being studied), as well as choices made in measurement (such as whether categorical or continuous measures are used), can have an effect on the power achieved.

Power calculations should precede the initiation of a preventive intervention trial to determine the requisite sample size (Muñoz, 1993). For example, for a universal preventive intervention trial targeting the general population with a short follow-up period to measure the onset of a disorder that has a low baseline frequency and unreliable diagnosis, having one million participants may not yield adequate power to detect statistically significant effects. On the other hand, for a trial of a potent selective preventive intervention sampling a relatively high risk population and using frequent, repeated measurements that are valid and reliable, with a long follow-up period and good retention of subjects, a sample size of 50 per group might be adequate. It is important to keep in mind that false positives will always be more frequent with small samples than with large ones. The issue, then, is not only how many participants to use, but also how to design the trial to get the greatest power within the limits of the trial's feasibility. Once issues of feasibility and likelihood of effects being found are determined, standard power calculations (Cohen, 1988) can be used to determine the number of participants that are needed.

## DOCUMENTATION ISSUES

For the committee's examination of preventive intervention research programs, it compiled a list of criteria, which appear in Chapter 7, to be

used in identifying research programs of particular merit. In
ing research programs in the future, the investigator may
guidelines useful. But an even higher standard will be desir
next decade of preventive intervention research. For exam
will need to be made to assess costs and benefits in a realist
the section on economic issues below).

When the research program has been completed, the de
pling, measurement, and analytic decisions should be spec
peer-reviewed literature and manuals in sufficient detail that
replicated by others. The background and rationale are als
When the results have been analyzed, the statistical met
should be reported in such a way that the proper inferences ca
about the effectiveness of the prevention program. Descriptiv
can be used to describe the groups at baseline and to demo
randomization of the groups. If the sample was stratified,
data can be presented for each stratum.

Some details should be presented about how many partici
recruited, how many screened, how many passed and
screening (and why), how many consented (and why refusals
how many of those who consented were actually randomized
some were omitted), and, of those randomized, how many en
assigned groups (and why others did not). Of those who e
randomized groups, how many completed the follow-up (ar
others not)? Of those who dropped out of the experimental a
groups, how long did they last in the protocol? What basel
were associated with dropout, and were they the same in
mental as in the control group? How many of those in the ex
and control groups complied with the protocol (and why
not)? In short, any information on the sample pertinent to
bias, measurement bias, or any other type of bias should be pr
that readers can judge how convincing the results are. A
format can sometimes present these data clearly and efficien

There should be brief descriptions of the protocols for re
retention, experimental and control delivery, and of mea
Documentation of the quality of measurement (reliability or
always valuable in aiding judgments of the results.

The estimated survival curves or hazard curves (or both),
to simple summary statements of statistical significance, are
assessing the size and hence the clinical or policy imp
statistically significant results. They are also essential in
whether nonsignificant results are the result of low powe
worth further pursuit or the result of ineffective preventive in

and thus not worth further consideration. If the secondary results prove informative, these might be documented with separate survival or hazard curves for subgroups found substantially different in response or for subgroups substantially different in terms of process (such as compliant versus noncompliant subjects).

## ISSUES OF CULTURE, ETHNICITY, AND RACE

As discussed earlier in this chapter, the success of preventive interventions—whether at the level of the individual, family, community, or nation—depends heavily on the contexts in which they are delivered. Clearly, anticipating the social and cultural elements of these contexts and accounting for such elements in terms of content, format, staffing, and implementation are critical to subsequent outcomes. Given the cultural diversity that characterizes this country, no discussion of the current and future status of preventive intervention research is complete without systematic attention to culture, ethnicity, and race (Muñoz, Chan, and Armas, 1986).*

Throughout the preventive intervention research cycle, investigators must be sensitive to the attitudes, values, beliefs, and practices of the cultural groups with whom they are working, as matters of good science and therapeutic leverage, as well as professional ethics (Kavanagh and Kennedy, 1992; Locke, 1992; Vega, 1992; Galanti, 1991). However, they must strive for more, namely, a set of skills and a perspective that have become commonly known as *cultural competence* (Isaacs and Benjamin, 1991; Cross, Bazron, Dennis, and Isaacs, 1989; Lefley, 1982).

Sensitivity and competence can be conceptualized as existing along a continuum (Orlandi, 1992). Cultural sensitivity is the awareness of a body of important information relevant to the population(s) of interest, which should inform the entire research process, from defining the sampling frame, through negotiating access, to actual intervention and dissemination of results. Such sensitivity can be, and typically is, learned through formal, didactic means and by familiarity with the rapidly growing literatures. It is a necessary but insufficient condition for cultural competence.

Competence is achieved through personal experience, either closely supervised practice or actual immersion in the field, which leads to the

*This section is based, in part, on discussions at a one-day meeting, convened by the Institute of Medicine, that focused on preventive intervention research issues related to special populations. (See Appendix C for participants at this meeting.)

acquisition and mastery of the skills needed to fit inter
context. Being competent involves employing the means b
improve the probability that this fit will occur, that the p
participants will embrace it, that the gains will be truly
valued, and that their diffusion to other potential beneficia
maximized.

The evidence is increasingly clear in regard to the lin
cultural competence and the success (or failure) of preventiv
tion research and programming (Orlandi, 1992; Neighbors,
Price, Selig, Donabedian, and Shannon, 1991; Manson, 1
some have argued for extensive retooling of graduate curri
social, behavioral, and health sciences to emphasize such sk
Debro, and Trimble, 1992). Though crucial to the evolution
preventive intervention research over the long haul, an
emphasis should be to encourage investigators to obtain
experience and to collaborate closely with other professional
themselves members of the communities of interest. Those
this challenge will undergo a process of discovery, gaining i
the equivalents between their own cultural framework (prof
well as personal in origin) and that of the people with whom
Ultimately, cultural competence specific to prevention w
through the conduct of preventive interventions themselv
reflection on what does and does not work, and constructive
intended to capitalize on success and reduce the likelihoo
failure.

The committee identified a number of points throughout t
tive intervention research cycle at which issues of cultural c
become especially salient and must be addressed. Several
illustrate the nature and frequency of such occurrences:

- Forging relationships between researchers and commu
vention research, typically conceptualized within and sprin
academic settings, needs to be married with indigenous effo
ularly those mounted by leaders of the communities of int
notion of prevention strikes a resonant chord in most ethni
communities. Considerable activity already is under way tha
nant with the intrinsic goals of prevention and with the ques
knowledge about how best to achieve these goals. Someti
community leaders may themselves function as senior inv
More often, they broker interactions between researchers a
pant communities, facilitating the accommodations require
their separate strengths and resources. In order for this proce

traditional power relationships must be transformed. Mutual respect, appropriate responsibility, equity in decision making, and shared commitment to negotiating differences are central to that transformation. Lacking these conditions, the ensuing power differential can become a major barrier to the research process.

- Identifying risks, mechanisms, triggers, and processes. Attempts to understand risk and protective factors, triggers, and processes regarding the onset of a disorder or problem should allow for the possibility of alternative explanation and circumstances among cultural groups (Neighbors, 1990). For example, risk factors can be unique to a specific population. Consider Levy and Kunitz's (1987) inquiry into suicide among the Hopi. They observed that rates of suicide are high not only among Hopi in "progressive villages" and off-reservation bordertowns, but also in traditional villages. Specifically, Hopis at increased risk for suicide include the children of parents who entered into traditionally disapproved marriages, such as across tribes, mesas, and even clans of disparate social status. The labeling of parents as "deviant" in this regard stigmatizes their children, thereby engendering a distinct series of stressors. Typical inquiries about marital status would not have arrived at this discovery, missing an important, systematic risk for suicide and related mental health problems.
- Employing relevant theoretical frameworks. Choosing theory to guide the intervention entails more than attending to the presumed links between cause and effect. It also must accommodate the relationship between what participants will (or are expected to) learn and those things valued by them. Different groups of people have different attributional styles, even different assumptions about consequences and costs. Numerous illustrations of the kinds of problems that can be caused by these differences can be found in Paul's (1955) book *Health, Culture, and Community: Case Studies of Public Reactions to Health Programs*. The best is the description by Wellin (1955) of what it took to mount a successful health intervention program in Peru. The problem was dysentery and typhoid; the solution was for people to boil their own water. The difficulty, however, was that the Peruvian community in question lacked an understanding of germ theory. Moreover, the interveners never anticipated that obtaining wood to fuel the fires necessary to boil water was difficult and costly. Analogous examples, both more current and closer to home, include similar disjunctions between conventional intervention models and health beliefs about hypertension among African-Americans (Dressler, 1987), intravenous drug use and HIV infection among African-Americans and Hispanics (Page, Chitwood, Smith, Kane, and McBride, 1990; Singer, Flores,

Davison, Burke, Castillo, Scanlon, and Rivera, 1990), and alcohol among Native Americans (Thurman, Jones-Saumty, and Parsons, Walker, Walker, and Kivlahan, 1988).

- Preparing the content, format, and delivery of preventive ventions. Individuals and groups are adapted to ethnocultural r defined in familial, social, political, and economic terms. To ignc historical and evolving nature of these niches is to court failure, disaster, for prevention research. There is ample documentatio unintended negative effects can accrue from cultural insensitivi incompetence (McCord, 1978). Thus considerable effort should pended to inform intervention efforts along these lines. Pilot wo pretesting ought to accompany all attempts to transfer prev technology across cultural boundaries. In this regard, ethnog stands out among the available methods (Trotter, Rolf, Qu Alexander, and Baldwin, in press; Gilbert, 1990; Montagne, 198 example, anthropological field work with Native Hawaiian ch revealed that peer assistance was important in children's daily act that learning occurred most often in "child-constructed" context that children were seldom individually directed and monitor adults (Gallimore et al., in press). These observations shaped a re school program, aimed at improving the educational attainm Native Hawaiians, that encouraged peer teaching in independent ing centers in which groups of three to seven children studied tog This design of the educational environment resulted in higher fr cies of on-task behavior, peer assistance, and work complet contrast to other classroom designs (Tharp and Gallimore, 1988). the infusion of local knowledge permits social validation of interv goals and procedures, enhances compatibility with valued end increases participation.
- Adopting appropriate narrative structures and discourse. people are willing to discuss, how they talk about it, and with they share certain matters vary in important ways across ethnic m and cultural groups (Kleinman, 1988, 1980). For example, there a great deal of discomfort in Hispanic families with respect to issues (Marin and Marin, 1991). Thus an AIDS prevention pr intended to reach Hispanics must recognize that discomfort about sexual behaviors is normative and approach the topic care risk losing audience participation. How individuals refer to and a given disorder or problem also can differ markedly by ethnic culture. "Down in the dumps," "feeling blue," and "feeling idioms, metaphors, and labels commonly used in white, midd America to refer to depression—do not have the same currency

Asian-Americans (Kinzie, Manson, Do, Nguyen, Bui, and Than, 1982) or Native Americans (Manson, 1993; Manson, Shore, and Bloom, 1985). Likewise, there are differences across ethnic groups in regard to the choice of person in whom to confide specific thoughts or feelings. African-Americans are much less open to discussing issues of shame and anger stemming from racial discrimination with persons whom they perceive as unlikely to have shared similar experiences and who are thus, presumably, less empathic (Neighbors et al., 1992; Jones and Matsumoto, 1982; Jones, 1978). For slightly different reasons, many Native Americans will not volunteer their beliefs about witchcraft as the cause of mental health problems, in part because such matters typically are kept secret from outsiders and, when disclosed, often meet with disdain or ridicule (Manson et al., 1985).

- Tapping critical decision-making processes. The means by which decisions are processed and the locus of responsibility for decision making can be quite different from one ethnic or cultural group to another. For example, nearly one third of Native American tribes explicitly invest a great deal of authority in women, largely as a function of the matrilineal structure of their social organization. Indeed, in some of these tribes, at the time of marriage, men will relocate from their parental homes to those of their wives and their wives' mothers. Decisions, then, that bear directly on the economics of the household, the allocation of family time and resources, and other life-style matters typically are more the responsibility of the women, of both generations, than the men. Though their role has been slightly eroded, family councils among Hmong refugees, who relocated to the United States after fleeing from Vietnam, remain central to conflict resolution and mediation of domestic disputes (Norton and Manson, 1993; Bloom, Kinzie, and Manson, 1985). Imagine the probability of success of preventive interventions that ignore, or even run counter to, such decision-making processes.
- Determining points of intervention leverage. Just as it shapes decision-making processes, social structure also influences access to people and defines points of leverage for subsequent intervention. A home visiting model for prevention, akin to that employed by Olds (see Chapter 7), would need, for example, among the Navajo, to take into account seasonal household migration and concomitant shifts in care-giving responsibilities (Dinges, 1982). At winter residences, maternal grandmothers, who produce many of the crafts for market, assume a central role in childrearing as a consequence of their sedentary activities. By contrast, during summer months, and being free from school, older female siblings are responsible for caring for younger children at the

large, extended family camps located deep in the foothills, c traditional grazing lands. Not only does the configuration of the and the corresponding roles, change, but so do developmental t young children. *Projecto Bienestar*, as described by Vega and col (see Chapter 7), which focused on Mexican-American women risk of depression, paid close attention to similar elements of ho composition and residential patterns, facilitating access to these uals and enhancing their participation in the intervention.

- Recognizing social networks and natural helpers. *Projecto* (Vega, Valle, and Kolody, submitted for publication; Vega and M 1990; Vega, Valle, Kolody, and Hough, 1987) also undersc importance of the resources and strengths that exist in all comm but which are accorded special prominence in ethnic minority As noted in Chapter 7, natural helpers (*Servidoras*) were empl deliver the intervention. This approach was congruent with t social ecology, reduced the social distance that often separates pant from intervener, minimized errors due to cultural incom and increased the likelihood that intervention skills and kn would be dispersed beyond the intended audience and contin delivered past the funding of the program. This same lesson is in reports of prevention programming among Southeast Asian (Bliatout, Rath, Do, Kham One, Bliatout, and Lee, 1985; Le X Bui, 1985; Lum, 1985; True, 1985), Asian-Americans and Pacifi ers (Murase, Egawa, and Tashima, 1985), other Hispanic pop (Szapocznik and Kurtine, 1993; Bestman, 1986), and Native A (Manson and Brenneman, in press; DHHS, 1990).

- Seeking fidelity of implementation. Many factors imping fidelity with which an intervention is delivered, as it moves fro controlled tests of efficacy to effectiveness and from applicatio community to another. An investigator struggling with this is (or is asked): Does what has been done or must be done in deliver the intervention compromise its integrity, and, thus, it rability to the original model? Service providers are seldom c with such questions; their mandate is to "make it work" in ter clients' best interests. No simple answers emerge for the re Clearly, the researcher has license to use the cultural equivale settings, units of intervention, key constructs, attributional p means of instruction, and reinforcement strategies that were us original model. But he or she then must carefully document th of these equivalences, how they were determined, and what fo take subsequently in the intervention. In many instances, th tions will pose little threat to fidelity. For example, suppl

written curricula with audio-taped versions for literacy-limited older Native American participants in a cognitive-behavioral intervention to prevent depression (Manson and Brenneman, in press) represents a minor deviation from the "Coping with Depression Course" developed by Lewinsohn, Clarke, and Hoberman (1989). Delivering the course through the continuing adult education division of tribally controlled colleges (Gallagher and Thompson, 1983) is another minor adaptation of the intervention. However, reworking the language of the intervention by substituting local idioms and metaphors for depression and drawing analogies between progressive relaxation techniques and indigenous forms of meditation carry the adapted intervention another step away from the original model. Here again, extensive documentation of effectiveness is essential.

- Replicating interventions across diverse and changing populations. The cross-cultural literature on prevention illustrates the great diversity among and within ethnic minorities. For example, some Asian-Americans have lived in the United States for four to five generations, although most, over 50 percent, have been here for fewer than 10 years. Among these individuals, then, language, including English fluency, varies significantly. Indeed, according to the 1990 census (U.S. Census Bureau, 1990), from 24 to 76 percent of the various Asian-American groups do not speak English "very well." A dozen or more distinct groups of Asian-Americans—Japanese, Chinese, Koreans, Vietnamese, Cambodians, and Hmong to name but a few—make up this special population, speaking more than 75 different languages. Similar diversity is evident among African-Americans, Hispanics, Native Americans, and Native Alaskans. Given such variability, interventions cannot be assumed to transfer easily across these lines, any more so than their original extension from the population for whom they were first designed.

Many investigators find the challenge of accommodating diversity of this nature and magnitude almost too daunting to consider. But the quest for cultural competence in this field carries with it an excitement. It promises to enrich the developing science of prevention and yield fulfillment from having successfully bridged differences thought unspannable.

## ETHICAL ISSUES

All types of scientific research face challenges in ensuring that their activities adhere to fundamental standards of integrity. Many of these

complex issues are reviewed in *Responsible Science: Ensuring the Integrity of the Research Process* (NAS, 1992). Policy recommendations were made to help scientists, research institutions, and government agencies protect the scientific process and minimize scientific misconduct, defined as "fabrication, falsification, or plagiarism in proposing, performing, or reporting research" (NAS, 1992, p. 27). This broad range of issues is applicable to prevention research, but the more narrow concern in this section is the ethical issues regarding the participants in preventive intervention research programs.*

Three factors combine to complicate the ethical issues involved in research on the prevention of mental disorders. First, the various disciplines and techniques that are being integrated into prevention research programs each carry their own complex ethical issues. Second, prevention research programs conducted in communities often require commitments, promises, and risks not encountered in basic research. Third, in many cultures mental disorders carry a special stigma.

The development of a specific ethical code for prevention research is premature and perhaps not even desirable. What is needed, however, is a sensitivity on the part of the individual investigator, and of the research community in general, regarding the importance of ethical issues throughout the preventive intervention research cycle. Investigators individually and as a field must recognize these issues in changing circumstances and respond responsibly—with appropriate questions, skills, and decisions. The development of this competence begins with formal training in basic principles but then requires a continuing process of self-education to instill the habit of ethical accountability.

We can begin to think about ethical issues regarding participants in research on the prevention of mental disorders by drawing on considerations from ethics in other areas of clinical research. Several professional associations and the federal government have developed guidelines that apply to research with human subjects. The federal government has a formal policy for the protection of human subjects in all research projects (DHHS, 1991); therefore this policy automatically applies to participants in preventive intervention research projects. Institutional Review Boards (IRBs) at the researcher's home institution must follow certain requirements for approval of research. These requirements include assurances that

*This section is based, in part, on discussions at a one-day meeting, convened by the Institute of Medicine, that focused on ethical considerations in preventive intervention research. (See Appendix C for participants at this meeting.)

- risks to subjects are minimized,
- risks to subjects are reasonable in relation to anticipated benefits,
- selection of subjects is equitable,
- informed consent is sought,
- informed consent is appropriately documented,
- data collection is monitored to ensure the safety of subjects, and
- adequate provisions are made to protect the privacy of subjects and to maintain the confidentiality of data.

Additional requirements of the IRBs are made to ensure the rights and welfare of subjects who are likely to "be vulnerable to coercion or undue influence," such as children, pregnant women, and economically or educationally disadvantaged persons—all potential targets for preventive interventions (DHHS, 1991, p. 6).

In addition to being bound by the values and standards that guard scientific integrity and by the IRB policies, preventive intervention research programs must address numerous specific ethical issues regarding participants. Pope (1990) has suggested several general guidelines for investigators to routinely consider:

- Do no harm. It is true that for some individuals, families, and communities, under some circumstances, being involved in prevention programs may have harmful proximal or distal consequences (Lorion, 1987). Pope stressed that focusing on the supposed welfare of the many cannot justify the harm that may come to the few. The importance of this issue is heightened by the fact that preventive interventions, by their very nature, involve people who are deemed "at risk" yet may not ever exhibit the disorder or behavior in question. But what standards of evidence are to be used in determining who is "at risk," especially in view of the fact that the importance of specific risk factors is not always well known.

Withholding a preventive intervention that is thought to be efficacious, as can happen in a randomized controlled trial design, may also be thought of as constituting inhumane treatment. This is not a problem early in the research cycle, when the investigator has little scientific evidence for believing that a particular prevention program does what it is intended to do, that is, reduce risks and maybe even lower incidence. Also, the preventive intervention is not like treatment, which is an attempt to deal with a current mental disorder that needs attention. However, the ethical dilemma of a randomized controlled trial design becomes more compelling at the stage of large-scale field trials, when the documentation of evidence from confirmatory and replication trials is encouraging (Muñoz and Ying, 1993). One way of dealing with this

dilemma is to have field trials in whole communities or neighborhoods, with control groups being entirely from communities where there is no access to the prevention program (CBASSE, 1993; Seitz, 1987; Cook and Campbell, 1979). Another way of dealing with this problem is to offer the intervention to the waiting list control group after the study has been completed if the results favor the experimental intervention.

Systematic methods must be developed for identifying the possible harm that may occur as a result of a particular intervention or failure to act. Although the methods used to identify possible harm will differ according to the population being targeted, the strategies of intervention being considered, and the problems being addressed, Pope has identified several crucial questions to be considered. First, what are the possibilities for direct harm to people participating in the intervention or to those indirectly affected, such as families, peers, or neighbors? This includes emotional, developmental, physical, interpersonal, educational, economic, and a host of other potential damages. Second, to what degree can delayed damages be anticipated? Because it is hoped that preventive interventions will produce positive long-term effects, it is reasonable to assume that harmful consequences also may be passed along, perhaps even to future generations. Third, if a community is the focus of an intervention, in what way might it be disrupted? Will its natural leadership and social cohesiveness be disturbed? If the group of prevention researchers differs significantly from the community in terms of such factors as social class, race, religion, or politics, what will be the effect on the community? What is informed consent for a community? Fourth, what effects that might be considered harmful could occur in the context of the community's relationship with the larger society? For example, in a project intended to minimize the incidence of serious depression, anxiety, and impulsive behavior in an economically disadvantaged neighborhood, it could be argued that some of these conditions are natural responses to severe poverty. Helping residents learn to adapt to desperate conditions might merely serve as a subtle, perhaps unintended, form of social control that could hinder the community's ability to identify the true source of its suffering and take effective action (Pope, 1990). And finally, what are the possibilities that effective prevention of one outcome will make another outcome worse?

- Practice with competence. In the early stages of a developing field, new approaches and techniques are frequently formulated, applied with enthusiasm, and then discarded when they prove unproductive. However, prevention is moving beyond this point and now possesses a growing body of knowledge and a set of skills that are prerequisites to action. Researchers can accomplish much by carefully analyzing a

proposed intervention to identify the information and areas of expertise ikely to be necessary for the competent planning, initiation, manage- nent, and evaluation of that project. Because prevention programs ocus on individuals, families, and communities—involving economic, olitical, psychological, social, educational, religious, and other diverse spects—an interdisciplinary team approach may be a necessity, with ach member bringing complementary sets of competences. Without uch interweaving of disciplines, important social or scientific facets nay go unexamined, possibly leading to unexpected harmful results.

- Do not exploit. Researchers are often in a position of power elative to the program's participants, and there are numerous ways this ower may be abused. In conducting an intervention effort in an conomically disadvantaged neighborhood, for example, researchers nay spend many hours establishing relationships with community nembers, in the process learning "secrets" that would not be apparent o outsiders. If the "life stories" of the residents are used inappropri- tely—perhaps for professional advancement, with little regard for the mpact on those who revealed the information in a bond of trust—both he scientific and the personal damages may be considerable (Pope, 990). It is critical, then, that researchers be clear about their own ontextual constraints before making promises to communities (Trickett nd Levin, 1990). Time constraints, economic resources, planning for he research program's termination—all of these issues carry ethical mplications for how an intervention program is presented and whether r not it is conducted in good faith.
- Treat participants with respect and dignity. At heart, all ethical rinciples flow from respect for the human dignity of others. Pope naintained that "scrupulous attention must be paid those aspects of our ducation and training, of our institutional structures, of the language nd content of our theories, research, and interventions which tend to liminish the degree to which we can appreciate, hold as fundamentally mportant, and respond appropriately to the full human dignity of thers. When the people who are affected by our primary prevention ategies become primarily known as 'research subjects,' 'populations- t-risk,' . . . case studies, etc., we may lose sight of the fact that they are ll full human beings struggling with life just as we are" (Pope, 1990, p. 7). In addition, individual characteristics such as race, ethnicity, ender, social class, sexual orientation, and age determine, to a larger xtent than is commonly acknowledged, how interventions are con- ived and implemented. The ethical ramifications of how this informa- ion is used need to be considered for each intervention.
- Protect confidentiality. Preventive interventions often involve col-

lection of extremely sensitive and potentially damaging information, such as narcotic use, frequently from large numbers of people. Researchers must identify the sorts of information that are or ought to be treated as confidential. This process includes, but is not limited to, checking carefully any legislation or case law that might govern confidentiality of such things as school records, membership lists of civil or religious organizations, and personal information obtained through interviews. The next step is to ensure that all parties involved or likely to be affected by the intervention clearly understand the boundaries between what is and is not confidential. In addition, the researchers must develop effective mechanisms for handling documents to safeguard their privacy and must develop procedures (including training procedures) to guard against accidental disclosure of confidential information through casual conversation or other means outside the scientific process.

Confidentiality poses especially difficult ethical concerns when researchers discover illegal activity such as evidence of violence, including child maltreatment, which under various state laws may have to be reported to the appropriate social welfare or law enforcement authorities. This combination of circumstances raises serious questions for those who consider as inviolable the trust and confidentiality between researcher and participant (Sieber, 1993). Should the researcher stop and warn a participant who starts to mention abuse? Should the researcher take what is reported and follow the law or seek ethical or legal loopholes to avoid the law? Should the researcher actively seek and report evidence of abuse and neglect? How much professional discretion should the researcher exercise in deciding what degree of abuse requires reporting, in relation to the likely outcome of reporting for the researcher, the project, the institutions involved, the person suspected of committing the abuse, and the person being abused?

Researchers involved in socially sensitive studies can obtain certificates of confidentiality that may preempt state reporting requirements and court subpoenas. They are available from the Department of Health and Human Services and the Department of Justice. Through continued examination of issues of confidentiality, on which opinions now vary considerably, researchers may identify ways to better ensure the efficacy and effectiveness of preventive intervention research programs while exercising responsibility for the welfare of victims and rehabilitation of perpetrators of violence.

- Obtain informed consent. An individual's right to understand a proposed intervention and to freely give or refuse consent to participate stands as a cornerstone of research with human subjects. Weithorn

(1987) has reviewed the ethical issues and federal regulations pertaining to informed consent for prevention. Research with children presents special problems. Children may be more susceptible to harmful consequences, such as stigma and labeling, of research participation; they also may be limited in their ability to provide informed consent because of their immature psychological functioning, limited understanding, and their dependent status as minors. Researchers should not confuse the ability of a child to understand procedures when explained with the more complex and mature cognitive task of making the comparative and contingent risk assessment judgments that are required in informed consent.

The ethical dilemmas that arise regarding informed consent often focus on questions of when and from whom to obtain consent, and what types of information to disclose in the consent process. For example, investigators are required to disclose to prospective participants the purposes and procedures involved in the research, possible risks or discomforts, expected benefits to the participants or others, and appropriate alternatives that might be beneficial. Federal laws, however, allow for less than complete disclosure under certain circumstances, although the boundaries are not always clearly defined. Weithorn presented some of the difficulties for a hypothetical study designed to prevent psychopathology in the children of schizophrenics. What should parents and children be told about the reasons for their inclusion in the project? A completely open disclosure would inform them, for example, that some percentage of the children of schizophrenics are likely to develop serious psychological disorders based on their membership in this risk group (Weithorn, 1987). But many investigators fear that such full disclosure would be harmful to the families, causing additional psychological trauma. Moreover, labeling of the group as "at risk" could possibly alter the behavior and expectations of family members and others, placing the child at further risk for the development of problems. A similar, and perhaps even more traumatic, disclosure would be the identification of a person found to be at risk of a mental disorder because of possession of a certain gene, a possibility in the not-too-distant future.

Weithorn (1987) concluded that prevention researchers should regard the federal regulations covering informed consent as an important guide, but view them as the minimum adequate standards and not as a substitute for careful reference to the moral principles that underlie them.

The principles of informed consent are especially difficult to apply when a universal preventive intervention involves an entire community. For example, a minority member in the community may oppose the

project, yet nonetheless may be subjected to its indirect effects. Methods of recognizing and weighing the rights of these individuals are needed.

- Promote equity and justice. At a minimum, preventive interventions must not directly affirm or contribute to inequality or injustice. But a truly ethical approach must go beyond the minimum, to active promotion of equity and justice (Pope, 1990). As with the other ethical areas, there are no simple answers concerning how to enhance the general social well-being. Keeping this goal clearly in mind, however, will help ensure that ethical dilemmas are not ignored or discounted, and that researchers and institutions explicitly attend to them.

To identify and attempt to resolve the various ethical issues destined to arise in preventive interventions, researchers will often be best served by joining with the members of the community—the providers of data and the targets of interventions (Trickett and Levin, 1990). As Conner (1990) has pointed out, ethical issues often involve trade-offs among competing sets of values that may or may not be shared between researchers and community members. He concludes that clients should play a central role in planning, implementing, and evaluating prevention programs.

Rather than simply moving into a community and implementing large-scale prevention programs, researchers might announce their plans and then formally listen to the community's response—including the response from broader constituencies than the program's direct participants—before proceeding (Pope, 1990). In a prevention program for children, for example, Trickett and Levin (1990) note that parents might assume a variety of roles that could increase the sensitivity of researchers to potential ethical issues and provide a forum for their resolution. Also, involving administrators in the planning of a school intervention program may lead to a commitment for continuing the program beyond its externally funded demonstration phase—itself an ethical issue.

Although there is consensus about the importance of ethics in prevention research on mental disorders, ethical accountability in this area has not yet received the emphasis it deserves. This remains a developing field, in need of increasing numbers of individuals and organizations possessing heightened sensitivity to ethical concerns and new skills for designing and conducting ethically appropriate intervention programs. Raising these ethical issues is not to suggest that initiation of preventive interventions should await unanimity on the goals and methods (Lorion, 1987). Rather, careful identification and analysis of these issues can be useful in broadening scientific perspective

and in increasing awareness of the potential range and impact of unintended consequences.

## ECONOMIC ISSUES

The allocation of available resources to activities aimed at reducing the burden of mental problems in our society requires some capacity to estimate the benefits and costs of our efforts. Analysis of costs and benefits can help inform decision makers about which kinds of interventions for mental disorders hold the most promise for yielding net benefits. The basic goal is to reach a decision on whether a particular intervention program is worth undertaking or whether an existing program should be discontinued, expanded, or reduced in scope.

Analysis of benefits and costs seeks systematically to identify and measure all the benefits and costs of a program (Muñoz and Ying, 1993). Obviously, if benefits exceed costs, then society profits from having the program available. On the other hand, if costs exceed benefits, a decision to allocate scarce resources to other purposes would seem warranted. There are two main methods for doing such an analysis. In cost-benefit analysis, costs and benefits are expressed in dollars. This process is adequate and straightforward for some measures, but it means that dollar amounts have to be assigned to all important outcomes. Assigning dollar amounts is difficult or nearly impossible for some measures, such as life and health. Cost-effectiveness analysis, on the other hand, avoids some of the above controversy by using two categories of outcome measures—dollars and health outcomes. Health outcomes can be presented, for example, in "years of healthy life gained."

The assumption is often made that preventive efforts are cost-effective. Some programs provide evidence that this may be true, but much more confirmation is desirable. The following useful framework is adapted from work by Russell (1986) for analyzing the cost-effectiveness of potential preventive efforts:

- Population and risk. The aggregate or net cost of an intervention depends on the size of the targeted population relative to the number of persons in the population who would be likely to develop the negative outcomes without the intervention. Even interventions that are relatively inexpensive per person may be quite costly in the aggregate if the target population is large and the number of persons in the population at risk is small. The more specific the definition of risk groups, the more likely the intervention will be cost-effective, other factors being equal.
- Cost and frequency of administration of the intervention. Preven-

tive interventions vary greatly in their cost. School curricu
tions, for example, may be relatively inexpensive. Schools
ongoing programming with much more effective curricula
little new cost in time or effort. On the other hand, intens
interventions using expensive professional personnel can be
per person served. The cost of the intervention depends also
costs, the size of the sample, and the required frequency of c
participants; as observed in Chapter 7, many preventive in
require multiple contacts over an extended period of time. T
of an intervention is a product of its initial cost and the f
administration.

- Potency of the intervention. Interventions vary in th
their effects. The efficiency of an intervention—as measu
proportion of those at risk affected and the size of the effect
taken into account in evaluations of cost-effectiveness.
- Uncertainty of risk. For many problems and disorder
status of associated risk factors, and therefore the benefits
ventions targeted toward reducing those risk factors, remai
as do possible adverse events. When the risk of developing
or problem is low and uncertain, thought must be given
associated with exposing large populations to interventions
advantages to most and possible adverse effects to some.
- Time. Another relevant consideration is the temporal
the result of the intervention to its administration. Benefi
greater for interventions that bring quick and persisting res
those with delayed results or results that lessen over time.

Once the preventive intervention moves into the commu
large-scale field trials, as well as on into the service realm, t
benefits may fall on different segments of society. The servi
organization may be willing to share part of the cost. To th
a service agency assumes the cost for a preventive inter
cost-effectiveness of the intervention should be measured
cost-effectiveness of other potential services. Alternatively,
tive intervention may be carried as a public service annou
administered by a community volunteer agency. Even thoug
not be direct costs for the health sector or service age
interventions would still entail costs in that they compete fo
uses of the resources.

Many potential preventive intervention research program
tent with the policy priorities for school districts, and the cla
teacher resources required to conduct them could be

relatively low cost. On the other hand, if the program requires the hiring and training of a new cadre of mental health worker—or even the retraining of existing personnel—the costs of the program could be so great as to compromise its viability.

The cost of prevention programs stems not only from the monetary cost of the intervention, but also from the potential costs involved for those receiving the service. This response cost or burden includes the participant's having to travel to a specific location, pay for travel or time lost for other activities, and undergo uncomfortable or time-consuming procedures, as well as the overall amount of effort involved in receiving the intervention. Perceived response cost may vary across sociocultural groups, even if monetary costs remain the same. For example, accepting "free" babysitting services while receiving a preventive intervention may be unacceptable to those cultural groups for whom sharing the childrearing responsibility is considered unwise or dangerous.

Prevention programs should not be funded by withdrawing resources from needed, and usually underfunded, treatment services (see Chapter 2 for definitions). Even though preventive interventions may have a significant impact in terms of increased socialization and reduced psychopathology, cognitive impairment, and psychosocial dysfunction, they are unlikely to result in an immediate reduction in the need for treatment interventions. In part, this is because those currently being treated are a small proportion of those suffering from a disorder.

Cost-benefit and cost-effectiveness analyses appear only infrequently in the treatment literature (Cardin, McGill, and Falloon, 1985; Weisbrod, Test, and Stein, 1980; Paul and Lentz, 1977) and are almost nonexistent in the prevention literature. As requests for these analyses increase over the next decade, there are several important points that policymakers and prevention researchers should consider (Gramlich, 1984). For example, benefits from prevention programs may increase over time. Short-term evaluations may show small or nonexistent benefits, but benefits may accrue as children are engaged over time in less crime, depend less on welfare, or begin to reap the benefits of higher levels of educational achievement. In addition, a well-designed and sensitive benefit-cost analysis can identify gainers and losers in society. Net social benefits may be received by participants in the program themselves, taxpayers, and potential victims of crime. Evaluation can show who gains and who loses as well as how big the overall gain or loss actually is.

One example of a pioneering benefit-cost analysis of a prevention program is that done for the Perry Preschool Program, a selective preventive intervention (Berrueta-Clement, Schweinhart, Barnett, Epstein, and Weikart, 1984). (See Chapter 7 for a description of the

program.) The investigators documented the costs of high-quality preschool education and the benefits resulting from positive program outcomes. Results suggested that the total net benefit to preschool participants themselves was approximately $5,000. On the other hand, the total net benefit to taxpayers and potential crime victims was estimated at around $23,000 for one year of preschool by the time the program recipients reached 19 years of age. As the authors observed, "changes in economic success, self-sufficiency, and social responsibility can be predicted quantitatively from observed effects at age 19" (Berrueta-Clement et al., 1984, p. 89).

Another example of a benefit-cost analysis of a preventive program is that done for the JOBS Project for the Unemployed, a selective preventive intervention aimed at helping the recently unemployed find new employment (Vinokur, van Ryn, Gramlich, and Price, 1991). (See Chapter 7.) Results from a 2½-year follow-up of participants in a randomized field experiment that included a jobs program aimed at increasing reemployment and preventing poor mental health outcomes showed the continued beneficial effects of the intervention on monthly earnings, quality of reemployment, and episodes of employer and job changes. Results of a benefit-cost analysis demonstrated large net benefits of the intervention not only to the participants, but also to federal and state governments, based on increased tax revenues produced by reemployed workers in the randomized trial. Not only did the benefits of the program exceed all costs within less than two years, but, because the wage differences appeared to persist, the benefits were expected to continue to accumulate over many years. According to the researchers' estimates, by the time experimental group participants reach age 60, they can be expected to have accrued $48,151 more benefit per person than their counterparts in the control groups, assuming they continue to be employed.

## CONCLUSION

If the research standards and methodology outlined here are systematically and rigorously applied within the preventive intervention research cycle and the guidelines on cultural, ethical, and economic issues are carefully considered at each step, prevention research will yield progressively more powerful results over the next decade. The ensuing development of prevention into a science will provide a firm base of knowledge for policymakers. This knowledge will inform their decisions on the allocation of available resources toward the ultimate goal of realizing the opportunities presented by the science for the alleviation of

the personal and societal suffering and burdens associated with mental disorders.

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# 11

# The Knowledge Exchange Process: From Research into Practice

The success of the preventive intervention research cycle, described in Chapter 10, for a given research program lies only partly in how well it works to expand the knowledge base for prevention. The ycle's ultimate merit—and the justification for the expenditure of large mounts of research monies—lies in how effectively that knowledge can e exchanged among researchers, community practitioners, and policy- nakers to successfully implement the program in real-life settings and ltimately, with widespread application, to reduce the incidence of nental disorders.

This chapter focuses on the process of exchanging knowledge. The erm *knowledge exchange* has been chosen for this process because it nplies two-way communication, including the feedbacks represented y the loop in Figure 10.1. The term *dissemination* is used when only a e-way flow of information is implied, for example, from researchers to ther researchers through publication of a journal article. Therefore, lthough the role the researchers play, as described in Chapter 10, is ritical to the success of knowledge exchange, it is only one part of a nore complicated process. The community's role is equally important, ot only in how it implements the program and provides feedback, but lso in how it goes about gathering the needed information. Policymak- rs at federal, state, and local levels also have a critical role to play in athering information to use in setting priorities for research and in upporting standards of excellence.

Researchers and community practitioners come to the knowledge xchange table with very different perspectives and value systems. Most

researchers, by nature, are cautious. They appreciate the complexity of etiology and the diverse pathways in the occurrence of mental disorders and usually are skeptical about unidimensional interventions, which may not generalize across populations diverse in age and culture. They have high standards for the quality of the evidence they believe is needed before practice recommendations can be made. This circumspect approach contributes to slowness in publication of evidence. For example, pilot studies and early field trials often are not published because the researchers believe that doing so might be "premature."

Although community practitioners, along with representatives from community organizations, may understand the reasons for caution, they are faced on a daily basis with the need for preventive services, and they often are frustrated by what they perceive as the unwillingness of the researchers to provide direction. The bottom line for practitioners, who often must answer to policymakers in state legislatures and local councils, is straightforward: What works? How long does it take? How much will it cost?

When these questions cannot be answered from the results of completed field trials within the research cycle, or when practitioners have creative ideas for new interventions, they proceed to create their own prevention programs. Currently, this is being done at the federal, state, and local levels of government and by private foundations. Such programs are primarily "service" in nature, although some, including demonstration projects, have evaluation components attached to them. The result is that large expenditures are being made without knowing the effectiveness of these services.

## THE ROLE OF THE COMMUNITY

The role of the community—defined here as policymakers, community practitioners, and representatives of host organizations—is complicated and time-consuming. Part of this complexity is due to the very nature of "community," which can rarely be regarded as a unitary whole. Rather, it is a heterogeneous group of individuals, institutions, and special interest groups, among whom it can be difficult to achieve consensus. The role of the community includes the following functions: defining the problem and assessing the needs, ensuring the readiness of the host organization, selecting a model program, balancing fidelity and adaptability while implementing the program, evaluating the program's effectiveness, and providing feedback to the researchers. Attention to this process is necessary for programmatic planning at federal, state, and local levels of government and with private foundations.

### Defining the Problem and Assessing the Needs

When community leaders, pressed by the urgency of local needs, must decide whether to initiate a service program for a particular mental disorder or problem, many factors will influence their decision. These include the degree of community concern about a specific problem, such as substance abuse, compared with concern over other priorities, such as education and police protection; the scarcity of resources for health care, especially mental health care; the availability of an effective model; the safety and cultural relevance of the model; and the availability of local interveners to deliver the program.

The community must define for itself what needs and problems it has and what it wants to accomplish. Initially, a community may be more interested in treatment and maintenance programs than preventive interventions. The timing for the introduction of a prevention program must be right for a community; a program foisted onto a community, even by a local practitioner rather than a researcher, is unlikely to succeed.

### Ensuring the Readiness of the Host Organization

If the host organization, such as a service agency, school, church, or city council, has had success in reaching out into its geographic community previously, has developed referral sources, and is respected within its community, it will have a better chance of success. Also, if the bureaucratic structure within the organization has some flexibility regarding its structures for communication, coordination, decision making, and role definition, it will be more able to adapt and implement a prevention program (Price and Lorion, 1989).

### Selecting a Model Program

The questions that the community and the host organization will focus on in selecting a particular model program include: Does the program address the needs and problems identified by the community? Is the program really ready for distribution? Has it demonstrated its efficacy and effectiveness? What aspects of the program would have to be adapted to fit the needs of this particular community, such as cultural issues? How much does the program cost, and how long must it continue to achieve positive effects? Is technical assistance available from someone who understands this particular program, such as someone from the original research team?

### *Criteria to Use in Examining Programs*

For a community searching for a model, practicality is paramou
An ideal model that has proved its efficacy and effectiveness throu
confirmatory, replication, and large-scale field trials is as yet, owing
the status of current prevention research, unlikely to be availab
Nevertheless, communities can be guided by the quality of evider
that is available from various prevention programs, some that ha
been tested in trials and others that have not. The following guidelir
regarding a hierarchy of evidence have been adapted from work by t
Canadian Task Force on the Periodic Health Examination and the U
Preventive Service Task Force (Battista and Fletcher, 1988; Spitz
1979).

Grade I: Evidence obtained from multiple randomized controll trials (confirmatory and replication trials and large-sc field trials).

Grade II: Evidence obtained from multiple randomized controll trials (confirmatory and replication trials but no lar scale field trial).

Grade III: Evidence obtained from at least one properly rando ized controlled trial.

Grade IV: Evidence obtained from well-designed controlled tri without randomization.

Grade V: Evidence obtained from well-designed cohort or ca control studies, preferably more than one.

Grade VI: Evidence obtained from multiple time series studies w or without the intervention. Dramatic results in unc trolled experiments (such as the results of the introdu tion of penicillin in the 1940s) could constitute this ty of evidence.

Grade VII: Evidence suggested by respected authorities, based clinical experience, descriptive studies, prior service livery programs, or reports by expert committees.

A community can use the criteria listed in Chapter 7 to assess quality of preventive intervention research programs. It can also use forward-looking methodologies presented in Chapter 10 to guide selection of a program. By making opinion subordinate to evidence a by searching for the highest level of evidence available, the communi in its program selection, increases the likelihood that its efforts will successful.

### *Information Sources to Use in Examining Programs*

Throughout the preventive intervention research cycle, there can be information and data ready to be exchanged with community practitioners and policymakers for general use. There are five main routes by which research findings are commonly disseminated: academic journals and books, manuals, clearinghouses, professional conferences, and direct working relationships between researchers and communities to facilitate implementation of the prevention programs. When a research program is being reviewed by a community, published papers and manuals should be obtained from libraries, clearinghouses, or the researchers themselves.

The committee reviewed the amount of knowledge dissemination currently available for examination by community practitioners and policymakers, as well as by other researchers. A description of this review process and the findings follows.

*Research Publications.* Peer-reviewed journal publication is the usual method of dissemination in all scientific fields, but it does entail a time lag between establishment of the data, the acceptance of the paper, and the distribution of the journal. In addition, many of these journals can be difficult for nonresearchers to locate.

The first step in the committee's review was to determine how large the prevention literature related to mental disorders was; then it could determine what portion of this was based on research. The following sources of information were used:

- MEDLINE searches.
- Computer Retrieval of Information on Scientific Projects (CRISP) files from 1988 through 1992 on research grants that identified prevention of mental disorder, alcoholism, or drug addiction as one of the main areas of emphasis. These files included grants from all three of the former ADAMHA research institutes—National Institute of Mental Health (NIMH), National Institute of Drug Abuse (NIDA), and National Institute of Alcoholism and Alcohol Abuse (NIAAA)—as well as other National Institutes of Health research institutes and the former Office of Substance Abuse Prevention (OSAP).
- Lists of research grants from the Prevention Research Branches of NIMH, NIDA, and NIAAA.
- Personal inquiries to NIMH Preventive Intervention Research Center (PIRC) directors as well as researchers of numerous "illustrative programs" identified by the research institutes, service agencies, private foundations, and many other sources.

- An annotated bibliography prepared under contract for NIMH. In 1991, NIMH contracted to compile an annotated bibliography of published work in the field of primary prevention in mental health (Trickett, Dahiyat, and Selby, in press). This compendium was a follow-up of an earlier bibliography that covered materials on primary prevention in mental health through early 1983 (Buckner, Trickett, and Corse, 1985). Because the field of prevention continues to have multiple definitions of its scope and boundaries, the editors' decisions as to what to include in both bibliographies were, by necessity, arbitrary. The second bibliography focused on published materials from later 1983 through mid-1991. It emphasized primary prevention, but where the boundaries between primary and secondary prevention were not clear, publications were included. A broad definition of primary prevention was used, including the concept of risk, prevention of specific disorders, enhancement of specific competences, empowerment, early intervention, and biosocial approaches to development. Although the main emphasis was on preventive interventions, articles were included if they had direct implications for preventive interventions or provided a conceptual perspective that was "heuristically rich." The data bases used for the search included PsycINFO, MEDLINE, SOCIOFILE, ERIC, and AIDS at the National Library of Medicine. The search also included journals that were identified as specifically representing the field, volumes emanating from primary prevention conferences, and information derived directly from NIMH Prevention Research Branch (PRB) researchers and the NIMH Panel on Biosocial Approaches.

In summary, the editors noted that, compared with the 1985 annotated bibliography, the second bibliography reflected how "the boundaries of primary prevention are stretching both in a biosocial direction on the one hand, and in an empowerment direction on the other" (Trickett et al., in press).

The committee analyzed the second bibliography and treated it as a main source for locating literature on prevention. Although it was not an all-encompassing source of available and/or relevant literature, and did not use the definitions of prevention and prevention research that the committee adopted (see Chapter 2), it was the most complete annotated bibliography dealing with prevention of mental disorders available.

The committee's findings are as follows. The bibliography has 1,326 entries, with 1,990 authors. These entries include journal articles, books, chapters, and monographs. For the committee's purposes, 109 of these entries were excluded from analysis because they centered on AIDS, a topic outside the committee's purview. Of the remaining references, 808

were journal articles, which included theoretical papers; findings from risk studies; descriptions of methodologies; descriptions of prevention programs, some with evaluation components; results from quasi-experimental research studies; and findings from approximately 25 preventive intervention research programs that, according to the abstracts, had used randomized controlled trial designs. These 808 articles were published in 224 journals. (This wide array of journals publishing prevention articles related to mental disorders from 1983 to 1991, compiled by using only the NIMH prevention bibliography as the source, can be found in Appendix E.) More than half of these 224 journals published only one prevention article. Many prestigious academic journals have published few or no prevention papers related to mental disorders. Notably absent from representation in the bibliography or publishing only one article were journals such as *The New England Journal of Medicine, Nature, Lancet, British Journal of Medicine,* and *Science.*

Table 11.1 lists the journals that have published the most prevention articles. The editors of the bibliography identified *Prevention in Human Services* and the *Journal of Primary Prevention* as the two journals that specifically represent this field, and indeed they may be because they have the most publications, 92 and 82, respectively, accounting for approximately 22 percent of the 808 journal articles. Unfortunately, these journals are not readily accessible, nor is their existence common knowledge. During the committee's work, the *Journal of Primary Prevention* was not easy to locate, even in the academic libraries in the Washington, D.C., area. It is not indexed in MEDLINE, nor is it available at the National Library of Medicine (NLM) or the NIH library. *Prevention in Human Services* is indexed and can be found at the NLM but not at the NIH library. The limited library circulation of these two journals make them essentially unavailable except by individual subscription.

During the course of its work, the committee compiled approximately 2,000 references. This data base, quite different from the NIMH prevention bibliography, is available as part of the background materials (available as indicated in Appendix D).

The committee next wanted to determine, in general, how many publications had been made available from funded research programs related to prevention of mental disorders. To do this, a cross-referencing of research projects and published work was done for one representative funding agency. The committee used NIMH as the example and cross-referenced NIMH-funded principal investigators with the bibliography prepared for NIMH. This check did not necessarily reveal that the investigators had published findings from NIMH-supported research,

TABLE 11.1 Journals Cited Most Often in NIMH Prevention Bibliography, 1983 to 1991

| | Num of Ar |
|---|---|
| Prevention in Human Services | 92 |
| Journal of Primary Prevention | 82 |
| American Journal of Community Psychology | 49 |
| Journal of Preventive Psychiatry and Allied Disciplines | 25 |
| Journal of Drug Education | 24 |
| Personnel and Guidance Journal | 23 |
| American Journal of Orthopsychiatry | 19 |
| American Psychologist | 18 |
| Child Abuse and Neglect: The International Journal | 18 |
| Journal of Consulting and Clinical Psychology | 18 |
| Journal of School Health | 15 |
| Journal of Community Psychology | 13 |
| Community Mental Health Journal | 10 |
| Infant Mental Health Journal | 10 |
| School Psychology Review | 10 |
| Journal of the American Academy of Child and Adolescent Psychiatry | 8 |
| International Journal of the Addictions | 7 |
| Public Health Reports | 7 |
| Social Science and Medicine | 7 |
| Acta Psychiatrica Scandinavica | 6 |
| American Journal of Psychiatry | 6 |
| Health Psychology | 6 |
| Journal of Behavioral Medicine | 6 |
| Journal of Drug Issues | 6 |
| Journal of Studies on Alcohol | 6 |

only that they had written and published material on prevention. O
112 grantees funded by the NIMH PRB from FY 1985 through FY
43 had entries in the bibliography. The entries totaled 168, but
researcher accounted for 28 of these. Many NIMH PRB researc
including those whose projects are completed, have never publi
their findings in peer-reviewed academic journals; others have w
book chapters that contain some data.

At the request of the committee, each NIMH PIRC director prep
a list of publications generated directly from support of the PIRCs.
11.2 shows the number and type of publications from the six center
the number of years the centers have been funded (one center
longer in existence). These publications were mostly in the are
theory, methodology, and risk, but some included data from preve
intervention research trials. The publication rates generated fro

TABLE 11.2 Publications from NIMH Preventive Intervention Research Centers (as of August 1993)

| | Years in Operation | Type of Publication | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Peer-Reviewed Journal Articles* | Books* | Chapters* | Research Manuals | Bibliographies | Manuscripts Submitted | Total |
| Prevention Research Center, Hahnemann University | (1983–1987) | 2 | 0 | 3 | 1 | 0 | 0 | 6 |
| Michigan Prevention Research Center, University of Michigan | (1983-present) | 26 | 0 | 17 | 17 | 4 | 5 | 69 |
| Preventive Intervention Research Center for Child Health, Albert Einstein College of Medicine, Montefiore Medical Center | (1983-present) | 53 | 2 | 37 | 0 | 1 | 10 | 103 |
| Prevention Research Center, Department of Mental Hygiene, The Johns Hopkins School of Hygiene and Public Health | (1984-present) | 12 | 1 | 8 | 3 | 0 | 5 | 29 |
| Program for Prevention Research, Arizona State University | (1984-present) | 53 | 2 | 15 | 8 | 0 | 12 | 90 |
| Oregon Social Learning Center, University of Oregon | (1990-present) | 5 | 0 | 1 | 0 | 0 | 0 | 6 |

* Published or in press.

PIRCs have been uneven. It is recognized that many preventive interventions require a long follow-up period to assess the effects of the programs and investigators are reluctant to publish findings prematurely. However, if the theory, methods, and results are not published in a timely fashion, communities and practitioners have little access to this information and cannot use it in designing their local programs.

*Manuals.* The advantage of manuals is that they can include details of the prevention intervention method that journals may not be interested in but which are crucial in the replication of a program by other researchers and in the adoption of the program by a community. However, preparation of manuals is very time-consuming; it is difficult to get funding for their printing and distribution; and they receive little recognition by academic departments when reviewing researchers' careers for promotion and tenure. The bibliography did not contain any entries for manuals. However, several of the researchers funded by the NIMH PRB, including those working within the PIRCs, have produced manuals. (See the abstracts in the background materials, available as indicated in Appendix D, for examples of programs that have manuals.)

*Clearinghouses.* There is no federal clearinghouse for published information on prevention of mental disorders. Table 11.3 lists several clearinghouses with materials relevant to prevention of mental disorders. The Center for Substance Abuse Prevention (CSAP, formerly OSAP) has one of the world's largest clearinghouses in its topic area, but little of its information deals with findings from rigorous preventive intervention research programs. The National Center on Child Abuse and Neglect (NCCAN) has a clearinghouse on child maltreatment literature, but only a small part of it is relevant to prevention. The National Prevention Coalition (NPC), a private, nonprofit organization affiliated with the National Mental Health Association, has the only clearinghouse that includes a concentrated focus on preventive intervention programs, and some of this material is research based. NPC currently has a grant from the Pew Foundation to provide program information to communities, but it does not have the capability to provide ongoing assistance on highly technical issues.

*National Conferences.* NIMH, NIDA, CSAP, and NIAAA hold national conferences focused on prevention, and others such as NCCAN have national conferences with some attention to prevention issues, but the crossover between agencies in each other's meetings is still rather

TABLE 11.3 Clearinghouses That Provide Information Related to the Prevention of Mental Disorders

**CSAP National Resource Center for the Prevention of Perinatal Abuse of Alcohol and Other Drugs**
**Center for Substance Abuse Prevention**
**Substance Abuse and Mental Health Services Administration**
**U.S. Department of Health and Human Services**
Lewin-VHI
9302 Lee Highway
Suite 310
Fairfax, VA 22031
703-218-5600

**Clearinghouse on Child Abuse and Neglect Information**
**National Center on Child Abuse and Neglect**
**U.S. Department of Health and Human Services**
P.O. Box 1182
Washington, DC 20013-1182
1-800-FYI-3366

**Mental Health Policy Resource Center**
1730 Rhode Island Avenue, NW
Suite 308
Washington, DC 20036
202-775-8826

**National Clearinghouse for Alcohol and Drug Information**
**Center for Substance Abuse Prevention**
**Substance Abuse and Mental Health Services Administration**
**U.S. Department of Health and Human Services**
P.O. Box 2345
Rockville, MD 20847-2345
301-468-2600

**National Committee to Prevent Child Abuse**
332 South Michigan Avenue
Suite 1600
Chicago, IL 60604
312-663-3520

**National Criminal Justice Reference Service**
**National Institute of Justice Clearinghouse**
**Department of Justice**
1600 Research Blvd
Dept. F
Rockville, MD 20850
1-800-851-3420

*(continued)*

TABLE 11.3 (*Continued*)

**National Maternal and Child Health Clearinghouse**
**Maternal and Child Health Bureau**
**U.S. Department of Health and Human Services**
8201 Greensboro Drive, Suite 600
McLean, VA 22102
703-821-8955

**National Mental Health Association**
**National Prevention Coalition**
1021 Prince Street
Alexandria, VA 22314-2971
703-684-7722

**National Prevention Evaluation Research Collection**
**Center for Substance Abuse Prevention**
**Substance Abuse and Mental Health Services Administration**
**U.S. Department of Health and Human Services**
Aspen Systems Corporation
1600 Research Blvd
MS-1C
Rockville, MD 20850
301-251-5180

**National Resource Center on Worksite Health Promotion**
777 North Capitol Street, NE
Suite 800
Washington, DC 20002
202-408-9320

**ODPHP National Health Information Center**
**Office of Disease Prevention and Health Promotion**
**U.S. Department of Health and Human Services**
P.O. Box 1133
Washington, DC 20013-1133
1-800-336-4797

**Ontario Prevention Clearinghouse**
**The Ministry of Community and Social Services**
415 Yonge Street
Suite 1200
Toronto, Ontario M5B 2E7
Canada
416-408-2121

**Resource Center on Substance Abuse Prevention and Disability**
1331 F Street, NW
Suite 800
Washington, DC 20077-1514
202-783-2900

limited. There is, however, an increasing awareness of the need for more cross-fertilization of ideas and exchange of research data.

*Working Directly with Researchers.* After reviewing information sources regarding prevention programs, a community may choose to seek direct consultation with prevention researchers, especially those who have conducted the program the community is interested in adopting. Currently, however, there is no formal federally funded mechanism for researchers to work directly with communities to develop preventive interventions for mental disorders. Sometimes this interaction does take place on an ad hoc basis. The NIMH PRB has recognized the need to include plans for knowledge exchange in continuation grant applications of the PIRCs. SAMHSA's Center for Mental Health Services has indicated an interest in being a link between prevention researchers and communities. However, its current Prevention and Program Development Branch was not mandated in the ADAMHA reorganization, so its continued existence is not ensured, nor does it currently have its own funding. Prevention resources have been limited to discretionary management funds from the director's office. The Centers for Disease Control and Prevention (CDC) works directly with communities through an extensive network of state public health departments on issues such as violence and suicide and has recently made a commitment to the scaling-up of the Infant Health and Development Program (see Chapters 7 and 10). The Department of Health and Human Services' Office of Disease Prevention and Health Promotion has disseminated some information on prevention of mental disorders but concentrates its efforts on physical disorders. At the state level, mental health departments or authorities are a possible mechanism for researchers to work directly with communities, but few states have made a significant commitment to prevention of mental disorders (Goldston, 1991).

## Balancing Fidelity and Adaptability While Implementing the Program

Maintaining *fidelity* means that a program seeks to maintain the original tested model as closely as possible, whereas allowing *adaptability* means that a program is permitted to have leeway and is encouraged to use innovations wherever necessary to adjust to local circumstances. As mentioned in Chapter 10, Price and Lorion (1989) have proposed that the appropriate resolution of the fidelity versus adaptability dilemma requires distinguishing between the *core elements* of the intervention and the *adaptable characteristics* that can be adjusted to local circumstances.

**BOX 11.1**
**Case Study: Replication of the Prenatal/Early Infancy Project**

"The Prenatal/Early Infancy Project in Elmira, New York, demonstrated impacts on birthweight, maternal health, reduction in child abuse, and improved maternal education or employment status when it was an experimental research program, but when the local health department took it over, the program was altered. As a demonstration project, the program had multiple sources of funding, including HHS, The Robert Wood Johnson Foundation, and the W. T. Grant Foundation. When the six-year grant funding ended in 1983, the local health department absorbed the program, while changing its definition and extent of services, target population, and caseload per home visitor. As a result of these changes, all of the original home visitors left within a few months. One director of county services told us that the program was no longer achieving the same reductions in low birthweight as the original project.

"The program's absence of final evaluation data in 1983, reduced financial support, and location within the local health department all contributed to the changes. Some of these changes resulted from a reluctance to invest substantially in a program whose benefits had not yet been fully demonstrated at that time. But a difference in philosophy also prompted the change in program focus. Local officials told us there was not unanimous agreement with the research program's broad health and social service orientation and intensity. They also did not agree with limiting services to the target population of first-time mothers—particularly low-income, unmarried teen mothers—even though these women were among the ones who benefited most from the experimental program. Local officials believed that some minimum level of home-visiting services should be provided to a larger group of pregnant women, which may be diluting the overall impact of the formerly targeted, high-intensity services." (GAO, 1990).

Unfortunately, researchers have rarely described their prevention programs in these terms. Sometimes it may be possible in retrospect to distinguish between what is core technology and what is not. When these elements are not specified, it is left to the community practitioners to decide, not always with the best results. The accompanying case study (see Box 11.1) shows what can happen to a preventive intervention program when fidelity is not maintained. (See Chapter 7 for a description of the original program.)

### Evaluating the Program's Effectiveness

Because the transfer of programs from research to community settings always necessitates some adaptation, if for no other reason than that

new personnel are involved, the success of the program should never be taken for granted. The true test of a prevention program is not the efficacy and effectiveness in the research setting but the effectiveness in the real-life setting with the community in charge of the program. To determine that effectiveness, a program evaluation is done after the program has been completed. Ideally, evaluation is also done at multiple points along the way while the preventive services are being delivered. To increase objectivity, at least some of the program evaluators should be external to the program delivery process. The program evaluators must be involved from the beginning of the program's implementation in the community so they understand what the core elements and adaptable characteristics are. Ideally, such an evaluation not only critiques the prevention program but also provides feedback about the effects of the program on the needs and problems originally identified by the community.

Quality assurance and quality control are a major concern, especially as prevention programs are "reinvented." These programs evolve and change in response to adaptations required by real-life exigencies. Thus quality assurance issues must be included in the documentation and evaluation of prevention programs that are installed in community settings. For example, it is essential that the goals and interventions are explicitly stated in written form; that documentation of the provision or delivery of the preventive interventions in the community fits the description of the interventions in the prevention program manual and provides a paper trail to audit the program's quality; and that all documentation be readily available for review.

Evaluation of a prevention program will ensure its quality if (1) there are frequent audits of the fidelity of the interventions to their program design; (2) there are in-person reviews of the program by senior-level personnel; (3) staff are held accountable for the quality of the preventive interventions; (4) the program designers and agency leadership are held accountable for achieving desired outcomes; and (5) opportunities exist for frequent reviews by all personnel to resolve problems, suggest changes, modify program design, and provide mutual support.

### Providing Feedback to the Researchers

Researchers need to receive feedback from the community about their programs—the successes, the problems, and the creative solutions developed at the local level. It is also critical that they hear about current community needs so that when research priorities are set, these needs can be taken into consideration. The community can also raise ethical

issues, including selection of targeted populations, consideration of the values and interests of diverse cultures, and potential negative effects. (See the commissioned paper by Fawcett and colleagues, and the commentaries by Rothman and Gallimore, in the background materials, available as indicated in Appendix D.)

## STRATEGIES FOR OVERCOMING BARRIERS TO THE KNOWLEDGE EXCHANGE PROCESS

There are many barriers to the knowledge exchange process. Barriers to the adoption of innovative and effective prevention programs include those related to the prevention programs themselves; to the practitioners, clinicians, educators, and administrators involved in the service delivery; and to the host organizations.

### Barriers in the Prevention Program

One of the challenges to innovators in the prevention field will be to "package" their programs in such a way as to make them easy to disseminate and "user-friendly." User-friendliness can be increased by encouraging second- and third-generation users of the program to reinvent the program to better fit the constraints and opportunities in the local jurisdiction. Giving those responsible for implementing a prevention program permission to adapt the program components to fit local conditions—as long as the adaptations do not jeopardize the fidelity of the key, effective core elements of the program—increases the likelihood that the program will be accepted by the community.

Another element that can increase user-friendliness is "packaging." For widespread adoption of a prevention program to occur, the program needs to be packaged in a format that enables potential adopters or users to readily acquire the skills required for faithful utilization. Such packaging includes print materials with high degrees of specificity and operational description, audiovisual demonstrations of the methods in action, and well-designed workshops and training programs.

### Barriers Related to the Practitioner, Clinician, Educator, or Administrator

Many attitudinal obstacles to the use of prevention programs can arise in a wide diversity of audiences. For example, prevention programs are sometimes viewed by clinicians and others in the mental health enterprise as foreign to their traditional mandate to "treat the sick." Skepti-

cism and nihilism toward shifting resources to prevention are often expressed. Moreover, innovations in prevention programs that are complex, demanding, extended in time, and linked to a team for implementation can encounter problems in fidelity of delivery (Yeaton and Sechrest, 1981).

One of the keys to unlocking any potential opposition to engaging in preventive interventions is to provide relevant training to practitioners, educators, and other human service workers, equipping them with new knowledge, attitudes, and competences that will enable them to use the prevention programs with confidence. Thus, training the host of professional and paraprofessional interveners for prevention programs is a major requirement in elevating the status of prevention in mental health. One prerequisite for productive training or retraining of clinicians is to have trainers and consultants available who possess clinical credibility and administrative savvy and are readily recognized and respected by organization staff and managers alike. Teaching techniques—employing such methods as setting educational objectives, modeling or demonstrating the new skills to be learned, behavioral rehearsal with active coaching, and positive feedback for performance of the requisite skills (Kuehnel and Flanagan, 1984)—need to be used so that new competences can be successfully acquired and used.

Overcoming resistance among clinicians can also be achieved by a process of consultation and technical assistance similar in nature to that discussed in Chapter 10 at the point in the research cycle when trials are moved into the community. In the service arena the process before implementation of the prevention program includes (1) the identification of a relevant need in the target organization and among the organization's staff; (2) a feasibility assessment related to personal and organizational readiness for adoption of the prevention program; (3) the development of consensus for adoption of the prevention program; (4) the broadening of job descriptions and performance appraisals to include competences related to preventive interventions; and (5) the development of an implementation strategy.

### Barriers Within the Host Organization

To overcome bureaucratic and other inertia within the institutions that will be the legitimate purveyors of prevention programs, a sine qua non is to have the active support of the host organization—from top management to local unit chiefs and team leaders. Support must be translated into oral and written endorsements of prevention as a priority within the organization's mission statement and long-term goals; con-

cordance with the philosophy and basic assumptions of prevention; and allocation of resources (including time, staff, space, and equipment), as enunciated in annual reports and statements of goals, that matches the priorities and support needs of the prevention program.

Also vital for successful implementation of prevention programming is the presence, within the organization, of an advocate of prevention who is a credible formal or informal leader in the organization. This person coordinates the initial efforts to introduce an innovative prevention program, consults with the experts who are disseminating the program, communicates with top management as well as with line-level staff to solve problems related to implementation, and offers training and encouragement to those applying the prevention program.

Staff roles must be defined by the functions explicitly described by the prevention program, and conflicts involving overlapping roles and disciplinary differences—as can arise on an interdisciplinary team—should be openly discussed and resolved. Resolution of staff conflicts can be facilitated by reconciling job descriptions with the competences needed for delivering the prevention program.

## IMPROVING COMMUNITY ACCESS TO RESEARCH KNOWLEDGE

As described above, several existing federal and state institutions—such as SAMHSA's CSAP and CMHS, the Office of Disease Prevention and Health Promotion, the Centers for Disease Control and Prevention, and state mental health departments—are currently serving as brokers to communities of information provided by prevention researchers on intervention programs related to mental disorders. However, these efforts have been scattered, without mandate, and "catch-as-catch-can." Perhaps the utilization of prevention programs in mental health can take cues from successful experiences in technology transfer found in other areas of our society. For example, in agriculture, field agents of a state university's extension services work hand-in-hand with farmers to help them adopt new seeds, fertilizers, pesticides, equipment, and planting and harvesting techniques. Another example comes from the pharmaceutical industry, where "detail" sales representatives visit physicians in their offices and hospitals to provide information on new drugs and facilitate their adoption.

Any national research agenda for prevention of mental disorders will have to include the development of mechanisms for promoting the proper utilization and application of prevention technologies that have been validated in confirmatory, replication, and large-scale field trials. One model that could be considered is the concept of research knowl-

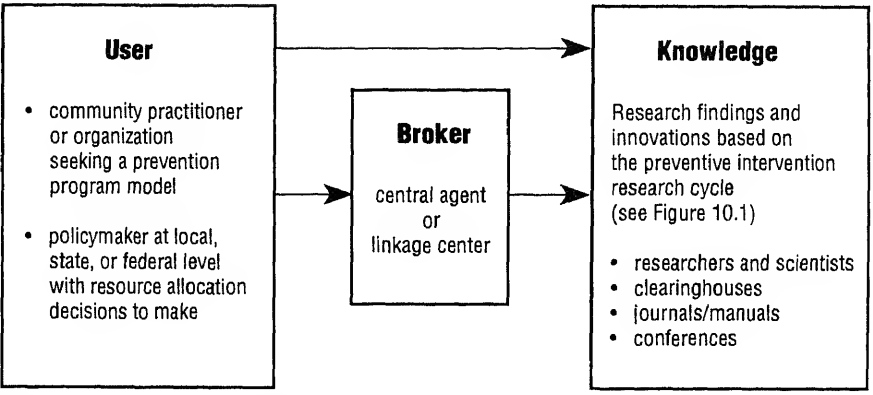


FIGURE 11.1 The process by which practitioners and policymakers access knowledge based on prevention research. Length of arrow indicates relative ease of access.

edge exchange centers, adapted from work by Liberman and Phipps (1987), which could be established regionally or nationally to serve as the broker, linkage center, or central agent between prevention researchers and scientists on the one hand, and practitioners, educators, administrators, and policymakers on the other. Figure 11.1 depicts a model that shows how such a center could provide this link.

Among the training and consulting roles that such a center would fill are (1) identifying new prevention programs from the scientific literature, clearinghouses, and conferences and from ongoing communication and liaison with innovators in the prevention field; (2) reviewing the quality of evidence regarding efficacy and effectiveness provided from the programs; (3) assisting "user communities" to choose and adapt prevention programs to fit their local constraints and resources and to ensure fidelity to the core characteristics of the program; (4) facilitating communities' evaluation of their prevention programs; and (5) using the feedback gained from working with the communities to assist researchers in refining and improving their prevention innovations so they can be ever more effective, efficient, and practical.

Of course, the community could go directly to the researchers and data sources themselves, but access to knowledge about effective preventive intervention research programs may be easier through a linkage center or broker. The amount and quality of interpersonal contacts between the linkage center or broker and the recipient organization may be critical to the successful adoption of the preventive program by the community.

## CONCLUSION

The committee's examination of the knowledge exchange process uncovered a number of points worthy of special attention:

- When a prevention research program is adopted for use as a community service program, issues of fidelity are paramount. Consideration of community needs and special populations becomes moot if a program is changed so much that it no longer is effective. Communities must be informed about the hazards of assuming that a program effective with one population will necessarily be generalizable to another.
- Increased methodological rigor must be applied to the design of preventive intervention research programs over the next decade. This is likely to lead to more articles being published in high-quality journals.
- Many research findings relevant to the prevention of mental disorders never have a chance to make an impact because they are never made known to the practitioners, educators, administrators, and policy makers who would use them. A coordinated plan for dissemination of the fruits of prevention research is needed, whether it be through existing institutions or newly created brokering or linkage centers.
- In order for communities to learn how to obtain and make the best possible use of the research knowledge, they will need the help of a new breed of prevention program facilitator who can bridge research and practice.

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# 12

# Infrastructure for Prevention: Funding, Personnel, and Coordination

Like any other field, preventive intervention research cannot thrive without providing for its infrastructure. What levels of funding and personnel are necessary to implement the prevention research activities outlined in the earlier chapters? How can the entire enterprise best be coordinated? To begin to answer these questions, the committee first reviewed the existing federal presence in the prevention of mental disorders. It determined which agencies have relevant research and service programs and reviewed the funding, personnel, and training resources supporting these programs. The committee then reviewed current coordination efforts among federal agencies.

## FUNDING

Estimates of funding levels for research on prevention of mental disorders were difficult for the committee to obtain for several reasons. First, the definitions of prevention and prevention research vary immensely across and within agencies. Basic research, risk identification studies, preventive interventions, treatment, and maintenance are all included in the U.S. Public Health Service's definition of "prevention research." Some agencies use this inclusive definition, and others do not. (See Chapter 2 for more discussion of this issue.)

Second, the definition of mental disorder varies. Although many agencies are doing work in this area, some of them do not see their activities as having anything to do with "mental disorders" because they use a narrow definition of that term. A broader definition, for example,

would include substance abuse and dependence. Other agencies use legal terminology such as "delinquency" rather than mental disorder diagnoses such as conduct disorder, although the terms often apply to the same people. Once it is generally acknowledged that precursors to mental disorders include behavioral dysfunction and clusters of serious psychological symptoms that do not yet meet full criteria for diagnosis, it is expected that more agencies will acknowledge their role in preventing these mental health problems. Moreover, agencies actively involved in prevention of physical illnesses, such as the National Institutes of Health (NIH) and the Centers for Disease Control and Prevention (CDC), often do not appreciate that an important outcome of their work is reduction of psychiatric morbidity. Thus the psychiatric consequences of preventive interventions for physical disorders need to be emphasized. With more consensus on these definitional issues, estimates of actual funding levels will be more easily obtained.

Third, data retrieval systems for information on research funding are difficult to access, inadequate, and sometimes misleading.*

### Data from an NIH Retrieval System

The committee reviewed data from the Research Documentation Section, Information Systems Branch of the Division of Research Grants at NIH. The division supplied Computer Retrieval of Information on Scientific Projects (CRISP) files of funded prevention research across NIH and the former Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA; which contained the three research institutes, the National Institute of Mental Health (NIMH), the National Institute on Drug Abuse (NIDA), and the National Institute on Alcohol Abuse and Alcoholism (NIAAA)). In the CRISP files, prevention research is classified by type: mental disorder prevention, alcoholism prevention, and drug abuse prevention. It is also classified by emphasis level, that is, the relevance of the indexing terms to the aims and objectives of the project. The emphasis codes are P = primary, S = secondary, T = tertiary, and M = main. (These codes should not be confused with terms used to describe types of intervention within the public health classification

*The Prevention Research Branches (PRBs) of NIMH, NIDA, and NIAAA initially found it difficult to comply with the committee's requests for lists of funded research grants back to 1988. The emphasis in the branches is on the current funding year, and hard-copy archives are not kept officially for more than a couple of years. (If they are, it is often by an efficient long-time support staff person.) Computers in the agency budget offices have eased these storage problems, and computerized lists are available.

ystem discussed in Chapter 2.) Main (M) emphasis codes are used only or parent projects of multiproject awards and are equivalent to the rimary (P) emphasis level. Therefore, in the committee's review, main nd primary levels were combined.

All items that appear in a CRISP printout are peer reviewed when hey are proposals. However, the type of peer review required varies ccording to whether the monies are intended for a grant or a contract. A contract proposal is not reviewed by the same standards or mecha- isms as a grant proposal. The contract proposals are reviewed through process called a secondary review, in which the review committee is omposed of a certain percentage of NIH personnel and a certain ercentage of outside experts.

The difficulty in assessing the funding commitments by federal gencies to prevention research is dramatized by the CRISP recording stem at NIH. The CRISP system has a number of serious problems vhen used to evaluate research programs. First, when funded projects ome into the system, they are classified by a staff person. Classifica- ions are not consistent, in part because a written definition of preven- ion has not been available for guidance. Second, the data are not omplete. For example, the CRISP lists of research projects did not natch the portfolios of funded grants supplied by the relevant program fficers at NIMH and NIDA. Only 24 of 80 grants funded from 1988 to 992 by the NIMH Prevention Research Branch (PRB) were even listed y CRISP as having a main/primary area of emphasis on prevention. Third, the same project can be classified in more than one prevention rea, for example, alcoholism prevention and mental disorder preven- ion. Fourth, there is no limitation on how many times a particular roject can be classified by emphasis code. For example, in fiscal year FY) 1991, 41 research projects (which were funded by NIMH, NIDA, NIAAA, the National Institute of Child Health and Human Develop- nent (NICHD), and the National Center for Research Resources NCRR)) were identified as having a main/primary emphasis in mental isorder prevention. The projects totaled $13,675,607. The numbers of ther primary, secondary, and tertiary areas of emphasis that each articular grant was classified as having were counted. These included reas as diverse as "psychometrics" to "social control" to "immunopa- hology." The 41 projects had 264 primary areas of emphasis in addition o mental disorder prevention, 312 secondary areas, and 114 tertiary reas.

The committee concluded that the CRISP system can miss directly elevant projects, on the one hand, and also can produce extensive nultiple counting of projects on the other, which can result in mislead-

ingly large estimates of efforts in a particular area. However, CRISP is one of the few available sources of data on prevention research projects. Table 12.1 shows the dollars awarded and the number of research projects and subprojects for mental disorder prevention, alcoholism prevention, and drug addiction prevention by NIH and ADAMHA. All of these data were compiled from CRISP printouts.

A few of the agencies identified by CRISP as having scientific projects in mental disorder prevention, drug addiction prevention, or alcoholism prevention have received only contracts, not grants. For example, see the column on drug addiction prevention in Table 12.1 for FY 1992. The Office of Substance Abuse Prevention (OSAP; now the Center for Substance Abuse Prevention (CSAP)) had 22 projects or subprojects totaling $102,112,353. Upon examination, all of these projects were contracts. The Office for Treatment Improvement (OTI) also had only contracts. NIAAA and NIMH, on the other hand, had only grants. NIDA had 53 grants and 11 contracts. In total, 43 percent of the FY 1992 drug addiction prevention projects were contracts, not subject to the same standard of review as grants. They totaled $135,247,179. In contrast, the grant monies totaled $20,807,047.

From the CRISP data, the following points are clear:

- Research on prevention of mental disorders, alcoholism, or drug addiction is not the domain of any one agency; rather, many agencies are involved.
- Expenditures for research on prevention of alcoholism and drug addiction have been far more than for research on prevention of other types of mental disorders.
- OSAP was created in 1990. The following year, NIMH's role in research on the prevention of drug addiction and alcoholism was drastically decreased.
- OSAP is not listed as having had any role in research on the prevention of mental disorders, but it has received far more money for research on alcoholism prevention and drug addiction prevention than any other office or institute within the former ADAMHA or NIH.
- The type of peer review and the number of grants versus contracts vary enormously across the agencies.

### Data from an ADAMHA Draft Report and from the PRBs

The ADAMHA Reorganization Act of 1992 transferred the three ADAMHA research institutes (NIMH, NIDA, and NIAAA) to NIH and established the Substance Abuse and Mental Health Services Adminis-

TABLE 12.1 Prevention Research Projects Funded by Agencies of NIH and the Former ADAMHA According to CRISP Definitions and Files

| | Mental Disorder Prevention (1838 8404*) | | Alcoholism Prevention (0080 8999*) | | Drug Addiction Prevention (0962 7764*) | |
|---|---|---|---|---|---|---|
| | Dollars Awarded | Number of Projects and Subprojects | Dollars Awarded | Number of Projects and Subprojects | Dollars Awarded | Number of Projects and Subprojects |
| FY 1988 | | | | | | |
| NCRR | 71,361 | 2 | — | — | — | — |
| NIAAA | 269,977 | 1 | 7,444,876 | 38 | 1,204,549 | 6 |
| NIDA | 245,143 | 1 | 955,839 | 5 | 12,868,727 | 44 |
| NIDR | 77,370 | 1 | — | — | — | — |
| NIMH | 4,596,638 | 18 | 5,467,078 | 2 | 5,983,948 | 3 |
| NINDS | 186,137 | 1 | — | — | — | — |
| Totals | 5,446,626 | 24 | 13,867,793 | 45 | 20,057,224 | 53 |
| FY 1989 | | | | | | |
| DM-BHP | 74,457 | 1 | — | — | — | — |
| NCNR | 271,759 | 1 | — | — | — | — |
| NCRR | 112,927 | 3 | — | — | — | — |
| NIAAA | 238,459 | 1 | 8,561,792 | 43 | 1,208,791 | 6 |
| NICHD | 121,729 | 1 | — | — | — | — |
| NIDA | 339,425 | 1 | 1,124,714 | 6 | 19,784,468 | 52 |
| NIMH | 5,253,651 | 22 | 7,015,665 | 17 | 7,532,535 | 18 |
| Totals | 6,412,407 | 30 | 16,702,171 | 66 | 28,525,794 | 76 |
| FY 1990 | | | | | | |
| NCNR | 151,814 | 1 | — | — | — | — |
| NIAAA | 343,634 | 1 | 12,711,923 | 51 | 1,790,248 | 8 |
| NICHD | 380,392 | 2 | — | — | — | — |
| NIDA | 381,426 | 1 | 3,664,251 | 9 | 31,894,783 | 73 |
| NIMH | 9,073,690 | 28 | 7,015,665 | 17 | 7,532,535 | 18 |
| OSAP | — | — | 37,802,237 | 6 | 44,001,150 | 10 |
| Totals | 10,330,956 | 33 | 61,194,076 | 83 | 85,218,716 | 109 |
| FY 1991 | | | | | | |
| NCNR | — | — | 25,000 | 1 | — | — |
| NCRR | 18,089 | 1 | — | — | — | — |
| NIAAA | 237,431 | 1 | 13,090,473 | 44 | 1,753,583 | 6 |
| NICHD | 1,654,804 | 4 | — | — | — | — |
| NIDA | 394,493 | 1 | 1,773,918 | 5 | 30,498,900 | 64 |
| NIMH | 11,370,790 | 34 | 487,432 | 5 | 487,432 | 5 |
| OSAP | — | — | 66,139,480 | 11 | 71,849,809 | 14 |
| OTI | — | — | — | | 564,542 | 2 |
| Totals | 13,675,607 | 41 | 81,516,303 | 66 | 105,154,266 | 91 |

*(continued)*

TABLE 12.1 (*Continued*)

| | Mental Disorder Prevention (1838 8404[a]) | | Alcoholism Prevention (0080 8999[a]) | | Drug Addiction Prevention (0962 7764[a]) | |
|---|---|---|---|---|---|---|
| | Dollars Awarded | Number of Projects and Subprojects | Dollars Awarded | Number of Projects and Subprojects | Dollars Awarded | Number of Projects and Subprojects |
| FY 1992 | | | | | | |
| NCNR | 194,672 | 1 | 25,000 | 1 | — | — |
| NCRR | — | — | 49,866 | 1 | — | — |
| NIAAA | — | — | 13,915,829 | 47 | 1,540,862 | 5 |
| NICHD | 1,773,029 | 3 | — | — | — | — |
| NIDA | 373,728 | 1 | 2,793,995 | 6 | 32,396,908 | 64 |
| NIMH | 13,444,251 | 40 | 487,432 | 5 | 487,432 | 5 |
| OSAP | — | — | 93,548,289 | 19 | 102,112,353 | 22 |
| OTI | — | — | 18,952,129 | 14 | 19,516,671 | 16 |
| Totals | 15,785,680 | 45 | 129,772,540 | 93 | 156,054,226 | 112 |

Abbreviations used are as follows:
DM-BHP - Division of Medicine - Bureau of Health Professions
NCNR - National Center for Nursing Research
NCRR - National Center for Research Resources
NIAAA - National Institute on Alcohol Abuse and Alcoholism
NICHD - National Institute of Child Health and Human Development
NIDA - National Institute on Drug Abuse
NIDR - National Institute of Dental Research
NIMH - National Institute of Mental Health
NINDS - National Institute of Neurological Disorders and Stroke
OSAP - Office of Substance Abuse Prevention
OTI - Office for Treatment Improvement

[a]Codes used by CRISP to identify areas of emphasis.

NOTE: See text for problems related to definitions and classification in the NIH Compute Retrieval of Information on Scientific Projects (CRISP) system.

tration (SAMHSA) with the following three agencies: the Center fo Substance Abuse Treatment (CSAT), CSAP (formerly OSAP), and th Center for Mental Health Services (CMHS) (see Table 1.1 in Chapter 1). This division between research and services entailed intense debate, an the advantages and disadvantages created by the reorganization ar likely to be reviewed for many years to come.

The original ADAMHA legislation required ADAMHA to prepare report on its prevention activities every three years and submit this t

*This reorganization occurred in the middle of the committee's review of the status prevention research.

TABLE 12.2 Prevention Activities Funded by NIMH, NIDA, and NIAAA (dollars)

| | NIMH | | NIDA | | NIAAA | |
|---|---|---|---|---|---|---|
| | Total Institute | PRB[a] | Total Institute | PRB[a] | Total Institute | PRB[a] |
| 1989 | 57,758,000 | 7,849,953 | 132,866,000 | 7,484,255 | 14,852,000 | 9,641,271 |
| 1990 | 77,945,000 | 15,153,315 | 168,853,000 | 16,612,418 | 21,337,000 | 16,521,839 |
| 1991 | 93,062,000 | 18,866,198 | 166,460,000 | 19,961,232 | 27,220,000 | 19,254,403 |
| 1992 | —[b] | 21,262,514 | —[b] | 19,731,873 | —[b] | 23,166,210 |

[a]Prevention Research Branch.

[b]No ADAMHA report was prepared for Congress.

NOTE: Figures for 1989–1991 totals are from the draft ADAMHA "Report to Congress on Prevention Activities 1989–1991." Figures for the NIMH and NIDA PRBs were compiled from the lists of grantees provided by the PRBs. Figures for the NIAAA PRB came from the NIAAA Budget Office. See text for problems related to definitions of prevention.

Congress. In 1992 a draft report was prepared by the ADAMHA director and submitted to the Secretary of the Department of Health and Human Services (DHHS). The committee used the figures from this draft report in its review of prevention. However, in 1993 the report was withdrawn; it was not submitted to Congress or released to the public.* This was because the legislative requirement for the report had been repealed by section 101 of the ADAMHA Reorganization Act of 1992.

The draft report included ADAMHA prevention activities and expenditures during fiscal years 1989, 1990, and 1991, including extramural and intramural research, service demonstrations, professional training and education, block grants, and miscellaneous activities, but excluding HIV/AIDS prevention. Prevention expenditures were reported as $382,529,000 in 1989, $643,792,000 in 1990, and $749,093,000 in 1991.

Table 12.2 shows the prevention expenditures reported by ADAMHA for each of the research institutes in 1989, 1990, and 1991. It also shows the grants funded by the Prevention Research Branches within those institutes during those years and 1992. These data came from the PRBs directly, not from the ADAMHA report. The differences in the expenditures are substantial. If the figures are accurate, most prevention activities took place outside the PRBs. However, this difference in reported expenditures dramatizes the problem of definition of prevention of mental disorders and the immense discrepancy in

*The committee acquired the report through the use of the Freedom of Information Act.

expenditures between service and research and between different types of research.

The ADAMHA report stated that during 1991 OSAP expenditures for prevention were $271,465,000, yet CRISP reported OSAP as having spent $71,849,809 on drug abuse prevention research and $66,139,480 on alcoholism prevention research during the same year. This difference reflects the amounts spent on services versus research, with the CRISP data reporting on research.

The Prevention Research Branches within the three research institutes—NIDA, NIAAA, and NIMH—vary in their research emphasis. Within the NIAAA PRB, there is both risk identification research and preventive intervention research. The branch increasingly has focused on youth and young adults, women, the elderly, and minorities. It has examined the effects of regulatory policies within the community and is interested in doing research on alcohol-related violence. The NIDA PRB is within the Division of Epidemiology and Prevention Research. The division has conducted several large, well-known epidemiological studies, but several of those have now been moved to SAMHSA; the division continues to sponsor risk identification research, and preventive intervention research at the individual, social environment, and community levels. A new initiative within this PRB is an effort to create prevention centers focused on testing culturally and ethnically sensitive preventive interventions. NIMH conducts prevention-related activities throughout its branches, but most of its preventive intervention research is within its PRB.

Only two of the three PRBs—those at NIDA and NIMH—have their own centers for prevention research. These centers are specialized, focusing on topics across the life span. NIAAA also has one, but it is not part of the branch. NIAAA's Prevention Research Center, in Berkeley, California, conducts basic research on identification of risk factors that contribute to alcoholism, including factors in the individual, family, peer group, work site, and community. It has initiated community preventive intervention trials to assess the effects of changes in availability of alcohol, such as minimum age of purchase and service interventions at restaurants and bars. Table 12.3 provides the history of funding levels for the NIMH prevention centers, called Preventive Intervention Research Centers (PIRCs), which were begun in 1983. Table 12.4 provides a similar history for the NIDA prevention centers, called Prevention Research Centers, which were begun in 1987. Overall, these centers in both institutes started with relatively modest support, and their current annual budgets average about $1 million per year per center. A major difference in the centers is that those at NIMH all focus on preventive

TABLE 12.3 Support Received for the NIMH PRB Preventive Intervention Research Centers (PIRCs) (dollars)

| Fiscal Year | Hahnemann University (P50MH38425[a,b]) | University of Michigan (P50MH39246[a]) | Albert Einstein College of Medicine (P50MH38280[a]) | Johns Hopkins University (P50MH38725[a]) | Arizona State University (P50MH39246[a]) | Oregon Social Learning Center (P50MH46690[a]) |
|---|---|---|---|---|---|---|
| 1983 | 289,000 | 245,814 | 461,124 | — | — | — |
| 1984 | 367,121 | 330,578 | 339,263 | 407,788 | 307,350 | — |
| 1985 | 295,750 | 263,007 | 506,829 | 439,761 | 282,361 | — |
| 1986 | — | 434,330 | 418,295 | 398,475 | 260,088 | — |
| 1987 | — | 497,988 | 497,948 | 427,810 | 312,207 | — |
| 1988 | — | 486,791 | — | — | 272,405 | — |
| 1989 | — | 130,000 | 806,500 | — | 130,000 | — |
| 1990 | — | 1,158,135 | 853,838 | 825,296 | 982,157 | 742,298 |
| 1991 | — | 807,757 | 925,456 | 1,102,418 | 765,815 | 1,099,980 |
| 1992 | — | 527,603 | 836,481 | 1,490,000 | 1,115,035 | 1,296,270 |
| 1993 | — | 722,947 | 672,145 | 1,637,851 | 1,282,436 | 1,348,120 |
| Totals | 951,871 | 5,604,950 | 6,317,879 | 6,729,399 | 5,709,854 | 4,486,668 |

[a]Research grant numbers.
[b]Discontinued.

NOTE: Figures are from the NIMH Budget Office.

TABLE 12.4 Support Received for the NIDA Epidemiology and Prevention Research Centers (dollars)

| Fiscal Year | University of Colorado[a] (P50DA05131[b]) | Western Psychiatric Institute, Pittsburgh, Pennsylvania[a] (P50DA05605[b]) | Center for Prevention Research, Lexington, Kentucky (P50DA05312[b]) | Columbia University (P50DA05321[b]) | Colorado State University (P50DA07074[b]) | Cornell University Medical College (P50DA07656[b]) |
|---|---|---|---|---|---|---|
| 1987 | — | — | 526,091 | — | — | — |
| 1988 | 399,500 | — | 527,965 | 658,451 | — | — |
| 1989 | 397,873 | 933,040 | 564,275 | 714,948 | — | — |
| 1990 | 414,671 | 952,960 | 431,299 | 676,427 | 779,485 | — |
| 1991 | — | 1,139,478 | 425,593 | 628,645 | 1,074,900 | 747,912 |
| 1992 | 844,653 | 1,200,835 | 1,003,734 | 844,820 | 1,072,500 | 1,003,626 |
| 1993 | 832,478 | 1,280,931 | 1,133,323 | — | 1,063,250 | 1,218,000 |
| Totals | 2,889,175 | 5,507,244 | 4,612,280 | 3,523,291 | 3,990,135 | 2,969,538 |

[a]Focused on epidemiology and risk research, not on preventive intervention research.
[b]Research grant numbers.

NOTE: Figures are from the NIDA Budget Office.

TABLE 12.5 Breakdown of NIMH Prevention Research Branch Budget for FY 1992

| | Number of Grants | Grant Amount (dollars) |
|---|---|---|
| Prevention of socioemotional problems among high-risk infants and toddlers | 8 | 2,231,974 |
| Prevention of conduct disorder in school-age children (including two PIRCs) | 11 | 6,004,495 |
| Prevention of anxiety and depression resulting from stressful life conditions (including three PIRCs) | 15 | 4,498,796 |
| Enhancement of coping mechanisms | 2 | 202,664 |
| Methodology | 3 | 282,839 |
| Research Scientist Award | 2 | 197,618 |
| Research training | 3 | 206,136 |
| Clinical training | 19 | 1,112,993 |
| Research demonstrations | | |
| Prevention of conduct disorder | 3 | 5,461,425* |
| Prevention of youth suicide | 3 | 1,063,574 |
| Suicide research conference | 1 | 0 |
| Totals | 70 | 21,262,514 |

*This total includes a RO1 research grant of $1,102,000.

NOTE: Figures are from the NIMH Prevention Research Branch.

intervention research, whereas at NIDA two focus on risk research and four focus on preventive intervention research. These latter four are within the PRB.

The breakdown of the NIMH PRB budget for FY 1992 is shown in Table 12.5. Most of the research grants are in three important areas: socioemotional problems among high-risk infants and toddlers, conduct disorder in school-age children, and anxiety and depression resulting from stressful life conditions. Half of the budget supports RO1 research and research demonstrations in the area of conduct disorder. (The research demonstrations are not to be confused with large-scale field trials as described in Chapter 10.) Very few grants are awarded to research on enhancement of coping mechanisms or on the development of methodology, although some methods development does occur within the PIRCs. Five times more is spent on clinical training than on research training. A review of the clinical training grants showed them to be part of the Depression Awareness, Recognition and Treatment Program, which is clearly treatment rather than prevention by the committee's definition.

## Overview of Government Involvement in Preventive Intervention Research

Research and services related to the prevention of mental disorders occur across a diverse array of federal and state agencies. Often this is not recognized or acknowledged by the agencies. Table 12.6 lists the federal agencies that are involved, though to varying degrees, in

TABLE 12.6 Federal Agencies Involved in Preventive Intervention Research and/or Preventive Intervention Services Related to Mental Disorders

- Department of Agriculture
- Department of Defense
- Department of Education
- Department of Health and Human Services
  - Administration for Children and Families
    - Administration on Children, Youth and Families
    - Head Start Bureau
    - National Center on Child Abuse and Neglect
  - Public Health Service
    - Centers for Disease Control and Prevention
    - Health Resources and Services Administration
      - Maternal and Child Health Bureau
    - Indian Health Service
    - National Institutes of Health
      - National Center for Nursing Research
      - National Institute on Aging
      - National Institute on Alcohol Abuse and Alcoholism[a]
      - National Institute of Child Health and Human Development
      - National Institute on Drug Abuse[a]
      - National Institute of Mental Health[a]
      - Office of Disease Prevention
    - Office of Health Promotion and Disease Prevention
    - Substance Abuse and Mental Health Services Administration
      - Center for Mental Health Services
      - Center for Substance Abuse Prevention[a,b]
- Department of Housing and Urban Development
- Department of Justice
  - Office of Juvenile Justice and Delinquency Prevention
- Department of Transportation
- Department of Veterans Affairs

[a]Formerly under the Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA).
[b]Formerly the Office for Substance Abuse Prevention (OSAP).

preventive intervention research and/or services related to mental disorders. This compilation is based on direct contacts with agencies and reviews of agency program plans and annual reports and is arranged in alphabetical order.

The overall DHHS support for all types of prevention activities related to both physical and mental disorders in FY 1991 was $14,753,933,000 (DHHS, 1992). In Table 12.7 the funding levels for 3 of 23 priority areas—alcohol and other drugs, mental health and mental disorders, and violence and abusive behaviors—are given for DHHS agencies (DHHS, 1992). Unfortunately, these do not separate services and research.

The Maternal and Child Health Bureau within DHHS is an agency well-known for its services to women and their children. It is presented here as an example of an agency that is not well recognized as contributing to prevention of mental disorders. A careful review of its grants revealed otherwise (see Box 12.1).

## Private Foundations

Many private foundations also support prevention services and research related to mental disorders. Some of the better-known examples include American Express Foundation, Ford Foundation, William T. Grant Foundation, Conrad N. Hilton, The J.M. Foundation, Henry Kaiser Family Foundation, Lilly Endowment, Inc., Meyer Memorial Trust, Annie E. Casey Foundation, The Robert Wood Johnson Foundation, the Carnegie Corporation, the W.K. Kellogg Foundation, The Pew Charitable Trusts, and the Colorado Trust.

## Conclusions

Rational planning for the nation's prevention research agenda requires much more accurate monitoring and reporting of prevention activities related to mental disorders. The Computer Retrieval of Information on Scientific Projects (CRISP) system has resulted in incomplete and inaccurate data with extensive multiple counting of research projects. In 1991 DHHS reported expenditures of approximately $2 billion for prevention activities related to mental disorders and abuse of alcohol and other drugs. According to the draft ADAMHA report, the funding of prevention activities was substantial in 1991—$749,093,000. ADAMHA's $749 million is likely to be incorporated into DHHS's $2 billion, but it is not clear that they were using identical definitions of prevention activities. In contrast to both of these large figures, the total 1992 budget of the three Prevention Research Branches at NIMH, NIAAA,

TABLE 12.7 Department of Health and Human Services Agencies Reporting Prevention Activities in Priority Areas, 1991 (dollars)

| | Alcohol and Other Drugs | Mental Health and Mental Disorders | Violent and Abusive Behavior | Overall Prevention Budget[a] |
|---|---|---|---|---|
| Public Health Service | | | | |
| Food and Drug Administration | 6,500,000 | 0 | 0 | 669,100,000 |
| Health Resources and Services Administration | 2,331,000 | 690,000 | 319,000 | 1,113,211,000 |
| Indian Health Service | 69,747,000 | 25,462,000 | 0 | 706,000,000 |
| Centers for Disease Control | 2,600,000 | 0 | 5,600,000 | 1,134,116,000 |
| National Institutes of Health | 2,840,000 | 6,112,000 | 1,652,000 | 1,927,963,000 |
| Alcohol, Drug Abuse, and Mental Health Administration | 426,703,000 | 43,134,000 | 5,364,000 | 753,907,000 |
| Agency for Health Care Policy and Research | 382,000 | 1,455,000 | 63,000 | 45,195,000 |
| Office of the Assistant Secretary for Health | 0 | 0 | 0 | 46,148,000 |
| Total Public Health Service | 511,103,000 | 76,853,000 | 12,998,000 | 6,395,640,000 |
| Health Care Financing Administration | 190,000,000 | 1,216,000,000 | 0 | 7,546,600,000 |
| Administration for Children and Families | 49,372,000 | 1,235,000 | 29,250,000 | 811,693,000 |
| Total resources reported in 1991 for prevention (DHHS)[b] | 750,475,000 | 1,294,088,000 | 42,248,000 | 14,753,933,000 |

[a]The overall prevention budget includes the three priority areas listed plus an additional 20 priority areas.
[b]Estimated.

SOURCE: Figures obtained from *Prevention '91/'92: Federal Programs and Progress* (DHHS, 1992).

## BOX 12.1
## Maternal and Child Health Bureau

The Maternal and Child Health Bureau (MCHB) is part of the Health Resources and Services Administration (HRSA) within the Public Health Service of the Department of Health and Human Services. In FY 1991, MCHB had a budget of approximately $637 million. Of this, $500 million was allocated for block grants to the states. The Maternal and Child Health Services Block Grant under Title V of the Social Security Act supports activities, through state block grants and project grants, to improve the health status of mothers and children.

> Funds are used for the purpose of enabling states: (a) to assure mothers and children (particularly those with low income or with limited availability of health services) access to quality maternal and child health services; (b) to reduce infant mortality and the incidence of preventable diseases and handicapping conditions among children, to reduce the need for inpatient and long-term care services, to increase the number of children appropriately immunized and the number of low income children receiving health assessments and follow-up diagnostic and treatment services, and otherwise to promote the health of mothers and children (especially by providing preventive and primary care services for low income children, and prenatal, delivery, and postpartum care for low income mothers); (c) to provide rehabilitation services for blind and disabled individuals under age 16 receiving benefits under Title XVI of the Social Security Act; and (d) to provide services for locating, and for medical, surgical, corrective, and other services, and care for, and facilities for diagnosis, hospitalization, and aftercare for children with special health care needs or who are suffering from conditions leading to such status.

During the 1980s the MCHB state block grants were largely unregulated by the federal government. However, as a result of new legislation in 1989, the directing of the states' monies was shifted and placed under more federal control. This shift was made "to improve states' planning, accountability, and targeting of federal funds to priority populations" (OBRA, 1989). Previously, the states only had to submit a report of intended expenditures to receive the block grant monies. Now, obtaining this money entails an application process, state and federal reporting requirements, and submission of annual reports for review, as well as several other provisions as outlined in the Omnibus Budget Reconciliation Act of 1989.

The remaining 1991 budget monies constitute the MCHB discretionary fund. The formula for this, which is set by Congress, is 15 percent of all appropriated state block grant funds plus an extra 12.75 percent of state block grant funds over $600 million. The discretionary monies are used for service demonstration programs, research, implementation programs, and training. Included within these monies are programs of special projects of regional and national significance (SPRANS), as well as Community Integrated Services Systems (CISS). Additionally, support is provided for emergency medical services for children, pediatrics AIDS health care demonstration projects, and Healthy Start (not the Hawaii Healthy Start program described in Chapter 7).

Every year, MCHB publishes the abstracts of the active projects supported with discretionary funding. A review of the 1991 book, which included 591

*continued*

abstracts and an index, provided an overview of the breadth of the work done through MCHB. In 1991, $8 to $10 million was used for research.

Much of the discretionary work of MCHB is highly relevant to the issues of promotion of mental health and prevention of mental disorders. However, the agency does not conceptualize these issues in this way. The index of the 1991 book of abstracts does not include some of the main terms and definitions used in this report. For example, there is no mention of mental disorders, mental health, risk, risk reduction, mental health promotion, or universal/selective/indicated preventive interventions. On the other hand, listings in the index do include substance abuse (101), alcohol (18), injury prevention (21), preventive health care (21), mother-child interaction (10), health promotion (9), child abuse (4), child neglect (12), behavioral disorders (3), behavioral problems (1), violence (7), and low birthweight (32). All of these issues are related to mental health and mental disorders, especially within a conceptual framework of risk reduction.

Many of the service demonstration projects, implementation projects, and research projects of MCHB are preventive in orientation, whereas others are more treatment oriented. However, the grants are not categorized according to this distinction. Using this committee's definitions, some grants were selective preventive interventions, and others were indicated preventive interventions.

Research grants clearly had been required to meet standards of methodological rigor, but the service demonstrations and implementation projects varied along a continuum of evaluation rigor. Although some approached high standards of design and evaluation, others provided "process evaluations" of questionable value.

MCHB has collaborated with other federal agencies and private foundations in its use of discretionary funds, including the former ADAMHA, the Centers for Disease Control and Prevention, the National Institutes of Health, and the Administration for Children, Youth and Families. Two research projects that MCHB has co-funded with private foundations stand out as exemplary preventive interventions that demonstrate how preventive interventions can have effects on both physical and mental health. These are the Infant Health and Development Program, which was conducted at eight sites, and the Study of Home Visitation for Mothers and Children, in Memphis, Tennessee, which is a replication study to validate the findings of the previously completed Prenatal/Early Infancy Project, in Elmira, New York, which also received MCHB support. (These programs are reviewed in more depth in Chapters 7 and 11.)

The ADAMHA Reorganization Act authorized the Health Resources and Services Administration under Title IV to make grants to provide services to children of substance abusers and families in which a member is a substance abuser. The services to children are to include periodic evaluation for developmental, psychological, and medical problems as well as preventive counseling services and counseling related to the witnessing of chronic violence. Evaluation of the effectiveness of these programs is to include assessment of the prevention of adverse health conditions in children of substance abusers. HRSA was also authorized under Title V to make grants for home visiting services for at-risk families. Services are to be targeted to pregnant women at risk of delivering infants with a health or developmental condition. Services are also to be provided to children under age 3 who are experiencing or are at risk of (1) health or developmental complications or (2) child abuse or neglect. Again, evaluation to determine effectiveness was stipulated in the act. Although support for these

services has not been appropriated, the act clearly has recognized the importance of HRSA's role in prevention of problems that are both physical and psychological. It would be beneficial—and not difficult—to employ rigorous methodological standards in these evaluations.

In light of the findings from this review, the committee makes the following suggestions:

- MCHB should be recognized for the critical role it has had and should continue to have in the prevention of mental disorders. More research needs to be done on the effects of risk reduction during gestation, infancy, and early childhood, and on the possible long-term effects on the reduction of new cases of mental illness. MCHB has access to and acceptance from high-risk populations because of its programs to provide physical health care.
- Efforts should be made to identify those projects that are related to a broad definition of mental health and mental disorders, using the conceptual framework of risk reduction.
- Preventive interventions within the mental health/mental disorder spectrum should be differentiated from treatment and from maintenance. Preventive interventions should be categorized according to the universal/selective/indicated classification scheme recommended in this report.
- Research of the quality of the two illustrative preventive interventions, the Infant Health and Development Program and the Study of Home Visitation for Mothers and Children (formerly the Prenatal/Early Infancy Project), should be encouraged.
- Evaluation of new projects should employ rigorous methodological standards.

and NIDA (all at that time part of ADAMHA) was $64,160,597. Expenditures at the PRBs included support for risk identification research, development of statistical methodology, training for identification and treatment of depression, alcohol treatment research, and other activities that, while worthy in their own right, are not preventive intervention research. Large preventive intervention demonstration projects were also included. While rigorous in their methodology, these have not been scaled up in size based on significant findings in prior pilot, confirmatory, and replication studies as recommended in Chapter 10.

In contrast to these findings, and using the definitions and guidelines developed in Chapters 2, 7, and 10 of this report, the committee's best estimate is that *the federal government's expenditure for rigorous preventive intervention research specifically targeted toward the prevention of mental disorders is approximately $20 million per year.*

For the reasons discussed in this chapter, it is difficult to precisely describe the current levels of expenditure by federal agencies. Nevertheless, this is the committee's best estimate of rigorous prevention research. Recommendations for increases in support (discussed in

Chapter 13) are derived from this estimate and the committee's analysis of the investment needed to enable the field of preventive intervention research on mental disorders to proceed.

## PERSONNEL

Using multiple sources of information, the committee tried to determine the number of researchers working in the field of mental disorder preventive interventions. One source of data that the committee examined was the CRISP lists of grantees (1988 to 1992) for all three types of prevention (mental disorders, alcoholism, and drug addiction). The total number of grantees was 202. As discussed previously, there are many problems with CRISP information.

In late 1992 the Society for Prevention Research had 125 members. The aim of the society is to foster the scientific investigation of prevention issues. Because the initial issue that brought the society's organizers together was substance use prevention, the members are mostly from the substance abuse field, including alcoholism. In mid-1993 the National Association of Prevention Professionals and Advocates (NAPPA) had 524 members. The early focus of NAPPA was on alcohol and other drug abuse prevention, but it now includes social and health problems. Most of the membership is professional, but relatively few are researchers. The National Mental Health Association (NMHA) has a prevention constituency of 144, but how many of these are researchers is not known. Researchers who belong to NMHA are likely to have research grants and to belong to other research societies. Therefore they are likely to be identified through other sources. From FY 1985 through FY 1991, 112 researchers were funded by the NIMH PRB. Not all of them, however, were preventive intervention researchers, and some of them are no longer active in the prevention field.

Allowing for other researchers who may be funded by state agencies, universities, private foundations, and federal agencies not listed in CRISP, it is likely that there are no more than 500 researchers in the field of preventive interventions for mental disorders. The number who are fully trained to do the rigorous research described in Chapter 10 is much smaller than 500.

### Probable Demand for Trained Prevention Researchers

Current and future budget constraints require that the proposed size of the training enterprise be congruent with the likely size of the research enterprise. Any proposal for training should be grounded in

projections of demand for personnel. The committee's projection of demand is based not only on its judgment that the conventional university-based research effort focused on preventive intervention als should increase in size, but also on its expectation that high-quality evaluations will be required for prevention service programs that are carried out in community organizations. Evaluation is critical when programs developed in research settings are adopted for the community. It is also essential when programs are developed in the community and have not been tested in research trials. This need for evaluation substantially increases the need for trained experts; the stakes are very high in terms of the national resources to be invested in these broad-based programs, whether they are universal, selective, or indicated. Thus the committee proposes that professionals trained in preventive intervention research are needed in federal, state, and local departments of education, social service, and public health. Although it is difficult to be precise, the steady-state national requirement of trained personnel, om various disciplines, is certainly at least 1,000 people.

### Educational Background of Current Researchers

Few, if any, current researchers in preventive intervention research have completed a formal training program designed to produce researchers in the prevention of mental disorders. The committee obtained data on the type of degree for 97 of the 223 CRISP grantees funded from 1988 through 1992. This information came from agencies and professional membership listings. Of the 97, 81 are Ph.D.s (most in psychology), 12 are M.D.s, and 4 are Ed.D.s. Other data provided by NIMH further confirmed that the field of preventive intervention research is composed mainly of psychologists. There are some physicians and sociologists and almost no nurses or social workers. The scarcity of researchers in these other disciplines is in part due to the lack of emphasis on research and on prevention in their training programs.

Prevention is not a discipline but an interdisciplinary field of research. Most current researchers were trained in their primary discipline and then learned their research skills as apprentices on a research team. Moreover, a substantial proportion of the current researchers in the field migrated to prevention research after working in other related areas of quiry. Many prevention researchers only do prevention research part e. As with some other fields, such as health services research, prevention of mental disorder research is impeded by traditional academic departments within universities that do not reward applied terdisciplinary studies, especially when the payoff is some time in the

future. All of these observations are what one would expect in a new and developing field, still defining and organizing itself.

### The Current Research Training Picture

The current preventive intervention research training effort is organized in such a fashion and funded at such a low level that an outside observer could reasonably conclude that policymakers wish to phase out investment in this field. Current institutional training programs are small and typically involve a 2-year training period. There may be five such programs in the entire United States, and the current output of trained (by the committee's standard) preventive intervention researchers from these institutional programs may be about 10 persons per year (assuming continuing funding and program viability). Additionally, there may be about 12 persons being trained on individual awards during any 1 year, with about half of them finishing their training each year.

The principal federal agencies that currently support research and training on prevention of mental disorders are NIMH, NIDA, and NIAAA. In FY 1992, NIMH supported three institutional training programs: Arizona State University at $117,237; Johns Hopkins University at $63,899; and Yale University at $25,000. The latter grant was terminated in FY 1993 because the principal investigator moved to another institution. During the last 6 years, these three programs have had a total of 23 postdoctoral students and 10 predoctoral students. Of the 23 postdoctoral students, 2 were physicians, 1 was a nurse, and 20 were psychologists. In 1992, the NIDA PRB had one institutional research training grant for 3 predoctoral and 3 postdoctoral trainees, all from nursing, and the NIAAA PRB awarded two institutional training grants, one for postdoctoral psychology training in alcohol research at the University of Washington and the other at the University of Georgia for research training on employee alcoholism. The program at the University of Washington, which has been in existence for 10 years, trains postdoctoral psychology students at a rate of 3 to 4 per year and some predoctoral students. The focus is on risk identification research as well as intervention research that is not restricted to prevention. The program at the University of Georgia, in existence for 5 years, has trained 9 postdoctoral students (5 sociologists, 3 psychologists, and 1 anthropologist; 6 women, 3 men; no minorities). The research focus of the center is on alcohol and the work site. Approximately half of the 9 students were interested in prevention, the other half in treatment. In 1993 the program had only 1 postdoctoral student and 7 predoctoral students.

TABLE 12.8 NIMH Grant Mechanisms That Can Be Used for Research Training or Related Activities

| | |
|---|---|
| F30 | National Research Service Award for Individual Predoctoral Fellows (M.D./Ph.D. Fellowships) |
| F31 | Predoctoral National Research Service Award Individual Fellowship |
| F32 | Postdoctoral National Research Service Award Individual Fellowship |
| F34 | Minority Access to Research Careers Faculty Fellowship |
| K02 | Research Scientist Development Award |
| K05 | Research Scientist Award |
| K21 | Scientist Development Award |
| K20 | Scientist Development Award for Clinicians |
| R24* | Minority Institutions Research Development Program |
| R24* | Research Infrastructure Support Program |
| T14 and R13 | Research Conference Grant |
| T32 | National Research Service Award for Institutional Grants |
| T34 | Minority Access to Research Careers: Honors Undergraduate Research Training Grants |
| T35 | Short-term Institutional National Research Service Award |

*Minority Supplement Award as well as Disability Supplement Award can be applied.

In addition to the institutional training programs, the research institutes have awarded some individual traineeships. In 1992 the NIMH PRB had 2 Research Scientist Awards; the NIDA PRB had 2 postdoctoral individual fellowships, 1 Research Scientist Development Award, and 6 Minority Supplement Awards; and the NIAAA PRB awarded 2 individual fellowships. Other federal agencies such as MCHB, CDC, and the Department of Defense (DOD) have the potential for developing research training programs with a clear focus on preventive interventions for mental disorders.

The crisis in prevention research training reflects a larger crisis in training in the entire mental health area. Although there are many grant mechanisms available at NIMH for research training (see Table 12.8), the levels of support are inadequate. Stipends from NIH are $8,800 per year for a predoctoral student, in comparison with $15,000 at the Department of Defense, $15,500 at the National Science Foundation, and $15,000 at the Department of Education. Postdoctoral stipends at NIH are $18,600 to $33,300. These stipends are taxable and do not include health insurance. Training-related expenses that are covered for predoctoral students amount to $1,500 and $2,500 for postdoctoral students, and there are no funds for research support. Such small training grants have an especially adverse effect on minorities, who may be unable to supplement the stipends with personal or family funds.

The current demand for prevention research training can be estimated

by the number of applicants for training positions. Because the numbers are small and fluctuate from year to year, the committee again must make rough estimates, but these numbers suggest that for now demand and supply are roughly in balance. There may be a slight surplus of applicants for training, but this may be desirable because it permits training institutions to make selections on the basis of quality. Until more high-quality research projects are funded, the supply of applicants for training positions is likely to remain small because many potential candidates will not see prevention as a viable and growing field.

The directors of training whom the committee has queried report that most graduates of their programs are employed, mostly at academic institutions and many in positions with responsibility for prevention research in funded projects.

### A Model for Training Prevention Researchers

It is important to begin to identify optimal training models and to develop mechanisms for sustaining financial support. One way of looking at the training of preventive intervention researchers is to ask what should such researchers (or research teams) know? By its nature, research in the prevention of mental disorders requires the ability to

- assess evidence regarding risk and protective factors—both biological and psychosocial—for onset of the various mental disorders;
- transform this knowledge, if sufficient, into preventive interventions;
- design, conduct, and analyze preventive interventions in the real world; and
- incorporate sound decisions regarding cultural, ethical, and economic issues into preventive intervention research.

As is clear from the description of the preventive intervention research cycle in Chapter 10, this research is inherently interdisciplinary, requiring knowledge of several core sciences (including genetics, epidemiology, and psychology) as well as postdoctoral experience in the specific methods of preventive intervention research. It requires familiarity with all of the disciplines normally associated with mental health, as well as other disciplines that are relevant to innovations in various social and mental health services, school systems, and communities.

The committee believes that conventional disciplinary training in any one of the fields ordinarily concerned with the diagnosis, assessment, and treatment of mental illness is not sufficient to prepare individuals for a research career in prevention, although it is necessary. In other

words, training in preventive intervention research should start with individuals who have already acquired knowledge and skills in such areas as nursing, social ecology, sociology, social work, public health, epidemiology, medicine (especially pediatrics, child psychiatry, and psychiatry), and clinical, developmental, social, and community psychology.

In addition to exposure to one or more of these basic approaches to a broad understanding of human behavior, training in preventive intervention research requires two other kinds of education or experience: (1) the design of interventions to prevent mental illness and (2) the analysis of the efficacy and effectiveness of an intervention. The intellectual orientations and methodological skills required for program design do not ordinarily receive much attention in the predoctoral programs of the behavioral sciences, and only slightly more in the practice-oriented fields of psychiatry and social work. Analysis demands still different orientations and skills, such as population perspective, that are almost entirely omitted from the "practice" disciplines and are only partially covered by other behavioral sciences. A program to train prevention researchers will require not only careful crafting of flexible and wide-ranging programs, but also close attention to each trainee's skills and knowledge deficiencies, careful mentoring and monitoring of progress, and suitable practicum experiences as well as didactic instruction.

Training in research design must be concerned with understanding the phenomena at issue: the nature and epidemiological distribution of the risk or protective factor that is to be reduced or enhanced. Knowledge of the particular mental disorder necessarily precedes and underlies an effective prevention strategy. Prevention programs should be based on sound research into the causes of mental disorders and also must go beyond that to understand how the disorders are manifest in everyday life. Further, training in design must invoke the know-how of implementing in practice an innovative idea that may have emerged from basic research.

Training in research focuses on learning how to obtain a dependable and unequivocal answer to the question of whether a particular intervention was indeed efficacious and effective in preventing mental disorder. Training also concentrates on learning about the processes by which the outcomes occurred, especially if the outcomes were not good. The questions are deceptively simple. The complications that make them difficult arise from the variability in human behavior, chance events in individual lives, errors in measurement, a tendency to overemphasize a few outstanding successes while ignoring a larger number

answers almost always require comparing a group that did receive a particular preventive intervention with a group that did not, and that feature brings into question not only how the experimental group was selected, but also the ethical propriety of intervening with some individuals and not others. These are the generic issues that training in research must confront.

Training in preventive intervention research requires direct experience in established institutions or centers carrying out prevention studies. A central feature of this model training program is the incorporation of practicum or internship-like training, as well as classroom or other didactic instruction. The trainee's experience should include participation in all phases of an actual preventive intervention research program that is being conducted by the faculty of the training institution. The trainee's mentors need to have had actual experience in one or more phases of design and analysis, and at least some of them should be actively engaged in such tasks during a trainee's participation. A clear implication is that the training institution itself must be actively engaged in a continuing program of preventive intervention research, perhaps with shifting emphases and different types of intervention, but steadily engaged.

Although this kind of training is available in medical or relevant doctoral programs, it is not common in the education of human resources professionals. First, it is labor-intensive and expensive. Second, it is not easy to identify and bring together the range of talents needed for the training faculty. The model program depends, in most instances, on interdisciplinary collaboration, which can be disrupted by academic mobility. It is hard to see how such training could be provided without external support, for the costs of faculty as well as trainees. Fellowships for individual trainees alone will not suffice. As discussed earlier, current federal training grants cover only a small fraction of such training and are subsidized heavily by the training institution and by research grants from NIH.

The committee concludes that a long-term strategy for preventive intervention research training should be developed at the postdoctoral level. There is a significant demographic change that may have an impact on this strategy. In the last decade or so, the number of faculty positions at research universities has been limited, and many graduates of doctoral programs in the social and behavioral sciences, public health, and other fields have been willing to accept postdoctoral traineeships while they waited for openings to occur. In the next decade, a substantial number of retirements from the faculty are expected among those who were appointed during the expansion years of the 1960s. For other

demographic reasons, there is likely to be, simultaneously, a smaller number of entrants into doctoral programs in fields related to prevention research. These two trends are likely to increase the demand for new Ph.D.s on faculties, thus making the traineeship less attractive, even with the prospect of an additional two years of training. Two possible solutions suggest themselves: one is to begin prevention research training earlier, say just before completion of disciplinary training. The other is to recognize the real costs of mid-career training for mature scientists with family obligations. The committee believes that support for both is necessary.

Postdoctoral training is a long-term strategy for increasing the number and quality of prevention researchers. What is needed immediately is a short-term strategy to "jump-start" the field. Mid-career scientists from related fields—risk identification research, epidemiology, treatment effectiveness research, and research on prevention of physical disorders—need to be recruited, trained, and adequately supported through increased stipends and increased availability of research grants.

It is possible that this presentation of a model training program may be misunderstood as being unduly narrow and rigid. The description should be taken as an indication of what the committee believes to be both desirable and feasible, without ruling out other possible approaches to the same goal. The field of prevention research should be open to additional training models as experience accumulates; a narrow prescription for training would be inappropriate at this time.

## Conclusions

The committee concludes that the national interest in the prevention of mental disorders requires the following general strategies for building training capacity:

- A gradual increase in the number of investigators trained and experienced in preventive intervention research.
- An increase in the number of physicians, nurses, and social workers trained in preventive intervention research.
- To "jump-start" the field, fellowships as well as intensive short-term training for mid-career scientists who wish to change fields and spend all or part of their time collaborating with an interdisciplinary preventive intervention research team.
- The development of more postdoctoral training programs.
- An increase in funding for both training and research. A large part

in research projects under the supervision of mentors. As indicated earlier, the training and research enterprises need to be coordinated so that the trainees are available to fill the need for researchers, both the need for researchers in an expanding research enterprise and the replacement of those who retire or leave the field.

- The creation of a career line that makes prevention research a rewarding profession, attracts high-quality talent, and sustains persistent attention to the difficult problems related to prevention of mental disorders. Such a career line includes forums for professional exchange, opportunities for continuing professional growth, and academic recognition of professional contributions, as well as mechanisms by which research, and researchers, can actually influence prevention programs and policy.

This capacity-building process will be a long-range effort, because the base from which it starts is small, and the start-up of new training programs is bound to be slower than the rate at which well-trained investigators can be effectively used. High-quality training is essential, and it will take time for potential new training institutions to assemble the required mix of professional talent. Leadership will have to be found within federal and state governments, universities, and foundations. Research training projects will require the cooperation of treatment and prevention agencies willing to try out new interventions and allow their efforts to be evaluated. Some training models may not be successful. The first 5 years will build capacity slowly, and it is important to have realistic goals for these years.

After a few years, with successful models for training programs, with developing career lines and the assurance of funding for prevention research, it is hoped that the curve of output growth will accelerate sharply—to the point where more ambitious long-range goals can be realistic. Accordingly, the committee suggests both 5-year and 10-year targets for the size of the training enterprise.

The committee's 5-year goal is to produce enough trained investigators in prevention research to provide staff for the larger number of training programs it envisions, for additional specialized prevention research centers in organizations that support research generally, and for research positions in some education and social service departments that now are, or soon will be, able to use their talents as these departments increase their standards for rigorous evaluation of program effectiveness. The committee's 10-year goal is to provide preventive intervention researchers in high-quality programs in major academic settings, in many departments of education and other social service

agencies at the state level, and in all of the training programs and specialized prevention research centers that are expected to be in place at that time. To achieve such a goal will require support from federal, state, and private sources.

Finally, mechanisms must be created that make it feasible and even attractive for talented mid-career scientists to switch into preventive intervention research. Mechanisms to accomplish this include research scientist awards and awards to establish chairs for distinguished scientists in prevention research. Both of these mechanisms have precedents within NIH. As with the institutional training grants, it is essential that these programs cover the full costs. If policymakers decide that the national interest requires the development of this field, then barriers to that development must be completely removed.

## COORDINATION

Federal agencies doing preventive intervention research and providing prevention services are decentralized and uncoordinated and have minimal awareness of each other's efforts. Few projects directly assess or attempt to intervene in the common phenomenon of co-morbidity among mental disorders, including drug and alcohol abuse. Even though NIMH is clearly the lead agency in research regarding the etiology and treatment of mental disorders, it has not taken a lead role in regard to the exchange of knowledge about preventive interventions with other federal agencies or with state agencies. In part, this lack of leadership regarding prevention knowledge exchange reflects the biomedical emphasis of NIMH, but it also is a result of NIMH's inability to coordinate its prevention programs with NIDA and NIAAA and other federal programs. Because many other DHHS agencies, such as SAMHSA, the Administration on Children, Youth and Families (ACYF), CDC, and HRSA; other departments, such as Education and Defense; nd state agencies conduct their own preventive intervention research and provide prevention services, it is essential that coordination efforts include them as well as the NIH research institutes.

There is no central clearinghouse within the government on prevention of mental disorders. There have been few prevention conferences outside of a single institute or agency. There is no organized system for the exchange of knowledge regarding prevention research, including effective intervention programs, with state public health departments, advocacy groups, or universities (see Chapter 11).

Many problems that exist within the federal government also exist in the network of private foundations mentioned earlier in this chapter.

For many years, these foundations and many others have provided substantial research and service funds for prevention, including the reduction of various risk factors associated with the onset of mental disorders. The network for information sharing and joint funding of projects among federal agencies and private foundations is an informal one, relying heavily on the individuals involved, much as it is within the federal agencies.

The extent to which the private and public funding sources overlap to provide for the career development of prevention researchers and for joint sponsorship of research projects could not be determined because there is no mechanism for recording this type of information. However, it appears that the overlap, at least sequentially, for a particular project or researcher may be considerable.

To coordinate these diverse participants in prevention, a lead agency would require several attributes. The ability of the lead agency to bring together all the interested federal, state, and private parties to facilitate an open sharing of ideas and information, a commitment to the investigations of multiple, co-existing risk conditions for mental disorders and the co-morbidity of dysfunctions and disorders, and a willingness to participate in joint projects are all essential. A commitment to prevention, as distinguished from treatment and maintenance, is equally important in the lead agency.

To place such a leading role outside the federal government does not seem possible, because the bulk of funds for preventive intervention research and service will continue to come from the federal government.

The reorganization of ADAMHA complicates the picture. With the split between research and services, none of the remaining agencies covers all the bases. SAMHSA has a clear role in the delivery of preventive services regarding drug abuse, but its role in prevention of other mental disorders is less clear. Although prevention is part of the mandate to SAMHSA's Center on Mental Health Services, there is no mandate establishing an Office of Prevention, and no support for prevention coordination was authorized. Each of the three research institutes at NIH (NIMH, NIDA, and NIAAA) has an Office of Prevention. The new law does not, however, establish any overarching authority to coordinate their activities, and categorical funding has contributed to competitiveness and isolation of the institutes from each other. It remains to be seen how these three research institutes will dovetail with the already established Health and Behavior Committee and Prevention Coordinating Committee at NIH. The links between the research institutes and the service programs at ADAMHA were already tenuous; coordination may now be even more difficult.

Furthermore, the research grant review process is fraught with difficulties across the institutes. These include lack of high-quality proposals, lack of proposals from minority investigators, lack of expertise in preventive intervention research on review committees that sometimes consider epidemiology, treatment, and prevention grants, vested interests on review committees that are dominated by "inside" prevention scientists (partly because prevention is still a small and young field), and reluctance of some review committees to allow investigators to combine funding streams from different institutes or agencies or to cross from one institute to another.

Even though other agencies, such as the Maternal and Child Health Bureau and the Administration on Children and Families within DHHS, as well as the Department of Defense, the Department of Education, and the Department of Justice, are valuable contributors and should be included in any coalition-building effort, none has enough current expertise on mental disorders to become the lead agency. The Office of Health Promotion and Disease Prevention has had an important role in coordinating information about prevention services and research within DHHS, but it too lacks expertise on mental disorders. Some of these agencies also lack expertise in research methodology.

The Centers for Disease Control and Prevention clearly has the best delineated mandate for prevention among federal agencies, and it has excellent outreach capabilities through public health departments. Recently, it has taken a more active role in prevention of violence and the prevention of problems associated with low birthweight. However, its current expertise in mental disorders is quite limited.

## Conclusions

There is little coordination of prevention research or prevention services across federal agencies, or among federal agencies, universities, and private foundations. In addition, research institutes and agencies frequently ignore issues of co-morbidity of mental disorders and of mental and physical disorders, as well as the co-existence of mental disorders and social and legal problems, such as delinquency. A less categorical approach to interventions may be productive to individuals as well as society, but there is no clear lead agency to provide such an approach. No agency has both the expertise in mental disorder preventive intervention research and an established track record in working collaboratively with other agencies and departments on prevention. Therefore the committee concludes that an alternative mechanism is

needed so that research and services on prevention of mental disorders can be coordinated across the federal departments.

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# 13

# Conclusions and Recommendations: An Agenda for the Next Decade

When President Roosevelt announced in 1937 that "one third of our nation are ill housed, ill clad, ill nourished," our country was galvanized into action. Yet today, when careful population studies tell us that as many as one third of American adults will suffer a diagnosable mental disorder sometime in their life and that 20 percent have a mental disorder at any given time, there is little alarm. The Institute of Medicine's Committee on Prevention of Mental Disorders believes that strong action is warranted, and with this report it calls on the nation to mount a significant program to prevent mental disorders. Although research on the causes and treatment of mental disorders remains vitally important—and indeed major advances are leading to better lives for increasing numbers of people—much greater effort than ever before needs to be directed to prevention.

Public health experience has shown that when a critical mass of knowledge regarding a specific health problem accumulates and a core group of expert researchers have been identified, the time is ripe for launching a larger, coordinated research and training endeavor. The committee believes that such a moment has arrived for the field of mental health. Opportunities now exist to effectively exploit existing knowledge to launch a promising research agenda on the prevention of mental disorders. *Therefore the committee strongly recommends that an enhanced research agenda to prevent mental disorders be initiated and supported across all relevant federal agencies, including, but not limited to, the Departments of Health and Human Services, Education, Justice, Labor, Defense, and*

*Housing and Urban Development, as well as state governments, universities, and private foundations. This agenda should facilitate development in three major areas:*

- *Building the infrastructure to coordinate research and service programs and to train and support new investigators.*
- *Expanding the knowledge base for preventive interventions.*
- *Conducting well-evaluated preventive interventions.*

As previously stated, the committee's recommendations for funding of rigorous preventive intervention research are based on its best estimates of current efforts and its judgment of needed resources to create a robust federal research agenda.

*The committee finds the need for prevention of mental disorders so great and the current opportunities for success so abundant that it recommends an increased investment across all federal agencies over the next five years (1995 through 1999) to facilitate the development of these three major areas of the research agenda. It recommends increased support of $50.5 million per year for the next two years, $53 million in year three, and $61 million per year in years four and five. These are modest increases considering the magnitude of the problem of mental illness in this country, and Congress may decide that an even greater investment is warranted.*

*Funding for the second five years should be recommended by a new coordinating body, such as a national scientific council on the prevention of mental disorders. The amount appropriated in year six should be no less than the amount of support in FY 1999. On the basis of positive results in the first five years, a considerably larger investment could be warranted during the second five years.*

*The three major areas to be developed are recommended in conjunction with use of the definitions of interventions for mental disorders and of prevention research developed in this report. The term* prevention *is reserved for only those interventions that occur before the initial onset of a disorder. These preventive interventions can be further classified into universal, selective, and indicated types. The term* prevention research *refers only to preventive intervention research and is distinct from research that builds a broad scientific base for preventive interventions.*

## BUILDING AN ENHANCED INFRASTRUCTURE FOR PREVENTIVE INTERVENTION RESEARCH

Preventive intervention research for mental disorders cannot thrive without providing for its infrastructure. Two areas are particularly important for moving ahead—coordination and research training.

### The Coordination Role and Structure

Coordination among federal agencies is needed for four reasons: (1) variation in the application of definitions has made it virtually impossible to assess the current activities and expenditures in preventive intervention research; (2) duplication of research activities and the lack of piggybacking of smaller projects onto larger ones contribute to waste of dollars and time, and, at the same time, gaps in research go undetected; (3) agencies conduct research or provide interventions for mental disorders (including addictions), educational disabilities, criminal behavior, and physical disorders as though these were separate conditions, whereas, more often than not, coexisting disorders or problems occur; and (4) agencies have different strengths; for example, some are better at applying rigorous research methodologies to intervention programs, whereas others are better at reaching out into communities and forging alliances.

In arriving at its recommendations about coordination, the committee reviewed various alternatives. The decisions to be made include (1) how best to coordinate the various relevant activities, (2) where the coordination function should reside within the federal government, and (3) staffing and funding issues. The structure and function of the coordination mechanism are inextricably intertwined, so decisions 1 and 2 above cannot be readily separated. Staff and funding should be attached to the coordination mechanism wherever it is located. Four alternatives were considered regarding where the coordination function should reside. Although the committee does express a preference for coordination at the highest possible level, it believes that establishing a successful coordination mechanism across federal departments is more important than the details of where it is housed.

Initially, the committee considered the model of putting a coordination role in one agency, such as the National Institute of Mental Health (NIMH) or the National Institutes of Health's (NIH) Office of Disease Prevention. Locating the coordination role in a single agency is a natural way to keep coordination close to the science, because the personnel in NIMH or the director's office at NIH are likely to be more closely connected to the scientific network than those higher in the government. Although single agencies have mediated coordination among other parts of the same department and even among branches of different executive departments in the past, the breadth and extent of the need for multiagency collaboration in this case make a single agency lead seem unrealistic. One possible exception is the Centers for Disease Control and Prevention (CDC), which has a public health mandate for

prevention activities and considerable experience in working collaboratively with federal, state, and local agencies.

Coordination from an office within one department that serves as an umbrella over several relevant agencies is a second alternative. The Office of the Assistant Secretary for Health within the Department of Health and Human Services (DHHS) already contains an Office for Disease Prevention and Health Promotion. This office could be charged with forming a subcommittee or task group to focus specifically on the coordination of research aimed at preventing mental disorders and substance abuse. These preventive efforts share many features with other disorders already subject to coordination within this office, but the involvement of the criminal justice system, the educational system, child and spousal protective services, civilian and military family support services, and other nonmedical services necessarily encompasses activities in an even broader array of federal agencies. Many of these services are housed in entirely separate cabinet departments. The committee thus believes that coordination at the departmental level is preferable to coordination by a single agency (with the possible exception of CDC), but the nature of the problem may well necessitate a higher-level coordination mechanism.

As a third alternative, the committee considered models developed within Congress, such as the Physician Payment Review Commission (PPRC) and the Prospective Payment Assessment Commission (PROPAC), for which appointments are made by an independent body—the Office of Technology Assessment. The question regarding these models is how well they would work in the prevention field, where many of the activities center on coordination of ongoing programs conducted within the executive branch.

As a fourth alternative, the committee considered other successful models—the ongoing White House Conferences, various presidential commissions, and the Office of Science and Technology Policy (OSTP)—within the White House. OSTP was originally created by President Eisenhower to focus national attention on science; after being disbanded, it was reestablished by President Ford upon the recommendation of the National Academy of Sciences (1974). This model has three components: (1) an office having coordinating responsibility regarding national science policy, (2) an individual who serves as the President's science advisor, and (3) a council with expertise in a broad range of scientific matters. The advantages of having a coordination structure under the White House are that it is at a natural level for coordinating activities of different cabinet departments and that it places a premium on interagency cooperation, which the committee believes is an essential element.

The committee thus leans toward the establishment of an overarching federal council, operated out of the White House Office of Science and Technology Policy or another coordinating office within the Executive Office of the President, to coordinate preventive intervention research. It recognizes that research and services related to the prevention of mental disorders have high relevance to the many other agendas and priorities of Congress and the President. These include the lack of high-quality education, deteriorating cities, drug problems, the lack of housing, poverty, and the lack of universal health care. Mental disorders contribute to these problems and vice versa; therefore the ultimate solutions must be broad in scope.

Adequate staffing and resources are essential to successful coordination of prevention research regardless of where it is located in the federal government. Moreover, the quality of leadership and extent of commitment among agencies are often far more important than the precise location of a coordination office. Leadership and commitment cannot be fully controlled, no matter how careful the plans may be. The competence of the particular individuals chosen to lead the effort and the politics of the day often determine whether interagency coordination is truly successful or merely an effort that consumes staff time and wastes increasingly scarce federal dollars. Despite these caveats, the committee nonetheless believes that a coordinating committee at the highest possible level with adequate staffing is necessary to weave together disparate federal activities in many different departments.

- *The committee strongly recommends that a mechanism be created to coordinate research and services on prevention of mental disorders across the federal departments. One model for accomplishing this would be the establishment of a national scientific council on the prevention of mental disorders by Congress and/or the President. Such an overarching federal council could be operated out of the White House Office of Science and Technology Policy or another coordinating office within the Executive Office of the President.* This council should formulate policies regarding preventive intervention research, evaluation of prevention services, knowledge exchange, coordination of interagency research efforts, and training. Because prevention activities span different departments, the members of the council should be appointed after soliciting nominations from a wide constituency who are willing to use the definitions and rigorous methodological criteria developed in this report to foster policies that will reduce the onset of mental disorders and related problems. Members should include—as equal partners—ex-officio high-level representatives of relevant federal agencies, including but not limited to the Departments of

Health and Human Services, Justice, Labor, Education, Defense, and Housing and Urban Development, as well as representatives from state agencies, private foundations, universities, and the public at large. A broad range of disciplines, including medicine (pediatrics, child psychiatry, psychiatry, primary care), psychology, nursing, social work, public health, sociology, and epidemiology, should be represented. The council should meet regularly to coordinate collaborative research across public and private agencies and should monitor the standards for rigorous methodological approaches to preventive intervention research. Terms on the council for nonfederal representatives should be limited. To provide ongoing executive leadership, the chair of the council should be appointed by the President. Other leadership positions could be selected from the nonfederal representatives. The council should have its own paid staff, including a coordinator with staff, who operates out of an office of prevention of mental disorders. The office should oversee and coordinate the daily operations of preventive intervention activities in all areas that are related to mental health across the federal government. The staff of the office should be responsible to the council. The council should report regularly, at least once a year, to the Congress and the President.

- *The committee also strongly recommends that Congress encourage the establishment of offices for prevention of mental disorders at the state level.* The current number of such offices is small even though the states have resources for prevention available to them through the state block grants. A mechanism to encourage the development of state offices would be a requirement attached to the block grants, and as health care reform is developed other possibilities may occur. The functions of these offices should be similar to those of the proposed national scientific council on the prevention of mental disorders. States that do establish such offices should, as a group, elect representatives to the national scientific council.
- *Agencies must be required to identify their funded programs for the prevention of mental disorders, separately accounting for universal, selective, and indicated preventive interventions, using the definitions developed in this report.* Congress should ask for separate accounting of these different kinds of preventive interventions when agencies report on the activities they support.
- *The National Institute of Mental Health (NIMH), the National Institute on Alcohol Abuse and Alcoholism (NIAAA), and the National Institute on Drug Abuse (NIDA) should consider including prevention researchers with broad mental health perspectives on their national advisory councils.* The prevention research field must produce more researchers of international stature who can serve on such advisory councils.

- *Mental health reimbursement from existing health insurance should be provided for preventive interventions that have proved effective under rigorous research standards such as those described in this report.*
- *Dissemination activities should receive much higher priority than they have in the past.* Agencies should disseminate results of research trials as well as evaluations of preventive intervention service programs. Funding of research trials should be continued only when investigators demonstrate a good publication record (including theoretical formulations and data from research trials). Interagency research conferences should be encouraged. A federal clearinghouse on preventive interventions in the mental health field should be considered, either as part of the council's function or as a separately funded initiative.

## Research Training

- Training is an immediate and critical need in preventive intervention research. *Congress and federal agencies should immediately take steps to develop and support the training of additional researchers who can develop new preventive intervention research trials as well as evaluate the effectiveness of current service projects.* This training effort should include consortiums, seminars, fellowships, and research grants to attract existing researchers into prevention research, training programs for new investigators, and expansion of the training component of the specialized prevention research centers.
- *Research training should be focused on two groups—mid-career scientists and postdoctoral students.* Training for these groups should be developed simultaneously, but the expectation is that the training efforts for these groups will produce two waves of personnel. As an immediate strategy, training opportunities with adequate stipends should be developed to attract talented mid-career scientists from related fields, such as risk research, epidemiology, treatment effectiveness research, and research on prevention of physical illnesses, who seek to make the transition to research on prevention of mental disorders. This could be done through existing fellowships and career development awards and through the development of creative consortiums, seminars, and mentoring. All training should be tailored to the needs and schedules of these scientists. Such training could have a substantial impact on the number of personnel within three years if there is a simultaneous increase in the funds available for peer-reviewed research projects (RO1s).

As a second strategy, training opportunities with sufficient stipends should be developed to attract talented postdoctoral-level trainees to preventive intervention research. Much more effort should be made to

attract trainees from a wide range of disciplines, including p
pediatrics, social work, nursing, public health, epidemiolo
science, anthropology, and sociology, as well as psycholo
dominates the field today. If efforts to boost doctoral trai
concurrently with mid-career training, we might expect
benefits of an increased pool of researchers capable of sec
own research grants by year five of a 10-year plan.

- *The number of institutional training programs focusing or intervention research should be increased from 5 to 12 over the nex including one at every specialized prevention research center, know as Preventive Intervention Research Centers (PIRCs), that is* Training of mid-career scientists and postdoctoral students sh within every specialized prevention research center. To ensu happens, funding of specialized prevention research centers continued only when they demonstrate good track reco production of published research and in the training of capable of procuring their own research grants. In addi specialized prevention research centers, research training supported by federal agencies, schools of public health, a traditionally linked to service, such as social work, educatio and medicine.
- *Support for faculty within institutional training progran increased.* Such support should increase the capacity of program, and university to train preventive intervention re
- *A major effort should be made to encourage the preven training of minorities.* Support should be offered to mino health research centers and other centers that focus on spe tions, such as low-income groups, the elderly, and mino This would add more researchers to the field, but even r tantly, they would be researchers who specialize in popu special needs.
- *The proposed national scientific council on the preventi disorders should reevaluate the training needs for preventive research after the first five years.* At that point the emphasis o scientists might be able to be decreased. If so, support for training could be increased. An emphasis on postdoct should be consistently high throughout the decade.

## Funding

Coordination and training are the two most immediate a needs in preventive intervention research on mental d